# CONTRIBUTIONS FROM THE UNIVERSITY OF MICHIGAN HERBARIUM

VOLUME 24

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ANN ARBOR, MICHIGAN
7 FEBRUARY 2005

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7 February 2005

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# GALPHIMIA (MALPIGHIACEAE) IN SOUTH AMERICA

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ABSTRACT. A revision of the South American species of *Galphimia* (Malpighiaceae) is presented. Four species, *G. amambayensis*, *G. australis*, *G. brasiliensis*, and *G. platyphylla*, are recognized. Full descriptions, a key, and two maps are provided. Each taxon is illustrated. One new species, *G. amambayensis*, is proposed.

*Galphimia* (Malpighiaceae) includes large herbs and shrubs characterized by yellow petals and a schizocarpic fruit separating into three cocci. The calyx lacks the oil glands found in most genera of New World Malpighiaceae; however, in some species of *Galphimia* a small gland, which resembles the leaf glands, is borne at the base of the sinus of some or all adjacent sepals (Castro et al. 2001). Most of the ca. 20 species of the genus occur in Mexico, adjacent Texas, and northern Central America, but the remainder are found in South America, south of the Amazon Basin. The Mexican species may be assigned to one of three groups defined by details of the inflorescence and flower. In two, the flowers are large and borne on a pedicel subtended by a peduncle; in one group the petals are deciduous, in the other they are persistent. The third group includes two species most similar in overall aspect to the South American taxa: the petioles are very short (mostly less than 1 cm long), the peduncle is rudimentary or absent, and the flowers are small (the petals deciduous).

Three species of *Galphimia* have been proposed for South America: *G. australis* Chodat, *G. brasiliensis* (L.) Adr. Juss., and *G. platyphylla* Chodat; however, most botanists have followed Niedenzu (1914, 1928), who recognized only one polymorphic species, *G. brasiliensis*, comprising several varieties and forms. A recent review of the South American collections of *Galphimia* showed them to belong to four species. *Galphimia brasiliensis* occurs in northeastern Brazil (Paraíba, Pernambuco, Piauí, and Bahia). The variable *G. australis* ranges from central Brazil to western Bolivia, southern Paraguay, Uruguay, and adjacent Argentina, and the closely related *G. platyphylla* is found in eastern Paraguay and adjacent Brazil. The material from eastern Paraguay included one collection that represents a species here newly described, *G. amambayensis*. The relationships of the South American taxa with the Mexican ones can be addressed only after a review of the entire genus. The taxonomy of the South American species is presented here as an aid to current floristic projects.

A key to the four species is presented below; however, they are quickly separated by geography and obvious morphological characters. Only *G. brasiliensis* occurs in northeastern Brazil, and has strigose vesture, composed of hairs with a persistent tuberculate base, and uniformly velutinous ovaries/fruits. *Galphimia amambayensis* occurs within the range of the widespread *G. australis* and near to that of *G. platyphylla*; it differs by its tomentose sepals and inflorescences, and partly velutinous ovaries/fruits; the sepals and ovaries/fruits of *G. australis* and *G. platyphylla* are glabrous. As the specific epithet implies, *G. platyphylla* differs from *G. australis* in its much broader leaves (length/width ratio 1.2–2.3 (–3) vs. (2–) 2.5–7 (–9).

## Key to the Species of Galphimia in South America

1. Sepals abaxially tomentose or patchily so; ovary and fruit velutinous along the sutures and on the proximal 2/3–3/4 of the surface, the distal 1/3–1/4 glabrous; Paraguay (Amambay).
*G. amambayensis*

1. Sepals glabrous or with scattered hairs near the base and/or with a tuft of hairs at the apex; ovary and fruit glabrous or uniformly velutinous.
   2. Ovary and fruit velutinous; sepals usually with a tuft of hairs at the apex; petioles 3–10 mm long, strigose with the hairs mostly borne on tubercles, or in older leaves only the persistent tubercles remaining; peduncles present, 0.4–2 (–3) mm long; Brazil (Bahia, Paraíba, Pernambuco, and adjacent Piauí).
*G. brasiliensis*
   2. Ovary and fruit glabrous; sepals entirely glabrous; petioles 1.5–6 mm long, glabrous; peduncles absent or rudimentary, sometimes to 1.5 (–2.5) mm long.
      3. Laminas linear to linear-lanceolate to lanceolate to narrowly elliptical, (0.5–) 1–2.5 (–3.3) cm wide, length/width ratio (2–) 2.5–7 (–9); pedicels tomentulose or with scattered hairs or sometimes glabrous; sepals 2.5–3.5 (–4) mm long, 1–1.8 mm wide; petal limb 3–5 mm long; cocci 3–3.8 mm long; widespread throughout southern Brazil, western Uruguay, Paraguay, and adjacent Bolivia and Argentina.
*G. australis*
      3. Laminas elliptical, broadly lanceolate, ovate to broadly ovate, occasionally suborbicular, (1.5–) 2–4 cm wide, length/width ratio 1.2–2.3 (–3); pedicels glabrous; sepals 4–5.7 mm long, 2–2.5 mm wide; petal limb 7–8.5 mm long; cocci 4–5 mm long; Paraguay (Amambay, Caaguazú, Canendiyú) and adjacent Brazil (Mato Grosso do Sul).
*G. platyphylla*

**Galphimia amambayensis** C. Anderson, sp. nov.—Type: Paraguay. Amambay: 30 km al N del cruce Bellavista y Pedro Juan Caballero, en matorral, 11 Feb 1982, *Fernández Casas & Molero 6190* (holotype: NY!; isotype: MO!). Fig. 1.

Suffrutex. Laminae 4.5–6.5 cm longae, 1.5–2.8 cm latae, ellipticae, sparse pubescentes demum glabrescentes, margine integra, glandulis 0.4–0.5 mm diametro, sessilibus; petioli 3.5–6 mm longi; stipulae 4–4.5 mm longae. Inflorescentia racemosa, tomentosa. Petala decidua, subaequalia, ungue ca. 2 mm longo, limbo 5–5.5 mm longo, 4–4.5 mm lato, late triangulari. Antherae ca. 1.3 mm longae. Ovarium velutinum proximaliter, suturis pubescentibus distaliter; styli subaequales, 5.5–6.5 mm longi. Cocci ca. 4.5 mm longi.

Subshrubs to 0.6 m; stems tomentose when young, becoming glabrous in age. Vesture of crisped or curled, reddish brown hairs 0.3–0.7 mm long, except straight and appressed on the laminas. Laminas of the larger leaves 4.5–6.5 cm long, 1.5–2.8 cm wide, elliptical or narrowly so, apex apiculate, base acute, adaxially and abaxially sparsely pubescent when young, mostly glabrous when mature but sometimes with some scattered hairs remaining, costa prominent abaxially, the secondary veins barely prominulous or not evident; margin entire; petioles 3.5–6 mm long, glabrous; leaf glands a pair borne on the margin near the base of the lamina or to 6 mm above it, each gland 0.4–0.5 mm in diameter, circular and flush with the margin; stipules 4–4.5 mm long, 0.7–1 mm wide, linear. Inflorescence a terminal raceme, the axes densely tomentose, glabrescent in age; peduncles absent or rudimentary, pedicels 4–6.5 mm long, densely tomentose; bracts 2.5–3.5 mm long, 0.7–0.8 mm wide, linear, bracteoles 1.2–1.5 mm long, ca. 0.5 mm wide, linear, bracts and bracteoles abaxially tomentulose. Sepals 3.5–5 mm long, 1.3–1.5 mm wide, narrowly elliptical, abaxially tomentulose or patchily so, glands absent. Petals deciduous, subequal (?), yellow, becoming red in age, abaxially sprinkled with hairs on the claw and on the limb on and adjacent to the midrib, or sometimes glabrous; claw ca. 2 mm long, ca. 0.5 mm wide, limb 5–5.5 mm long, 4–4.5 mm wide, broadly triangular, base acute. Stamens with heteromorphic filaments but subequal anthers; filament opposite anterior sepal 3.5–4 mm long,

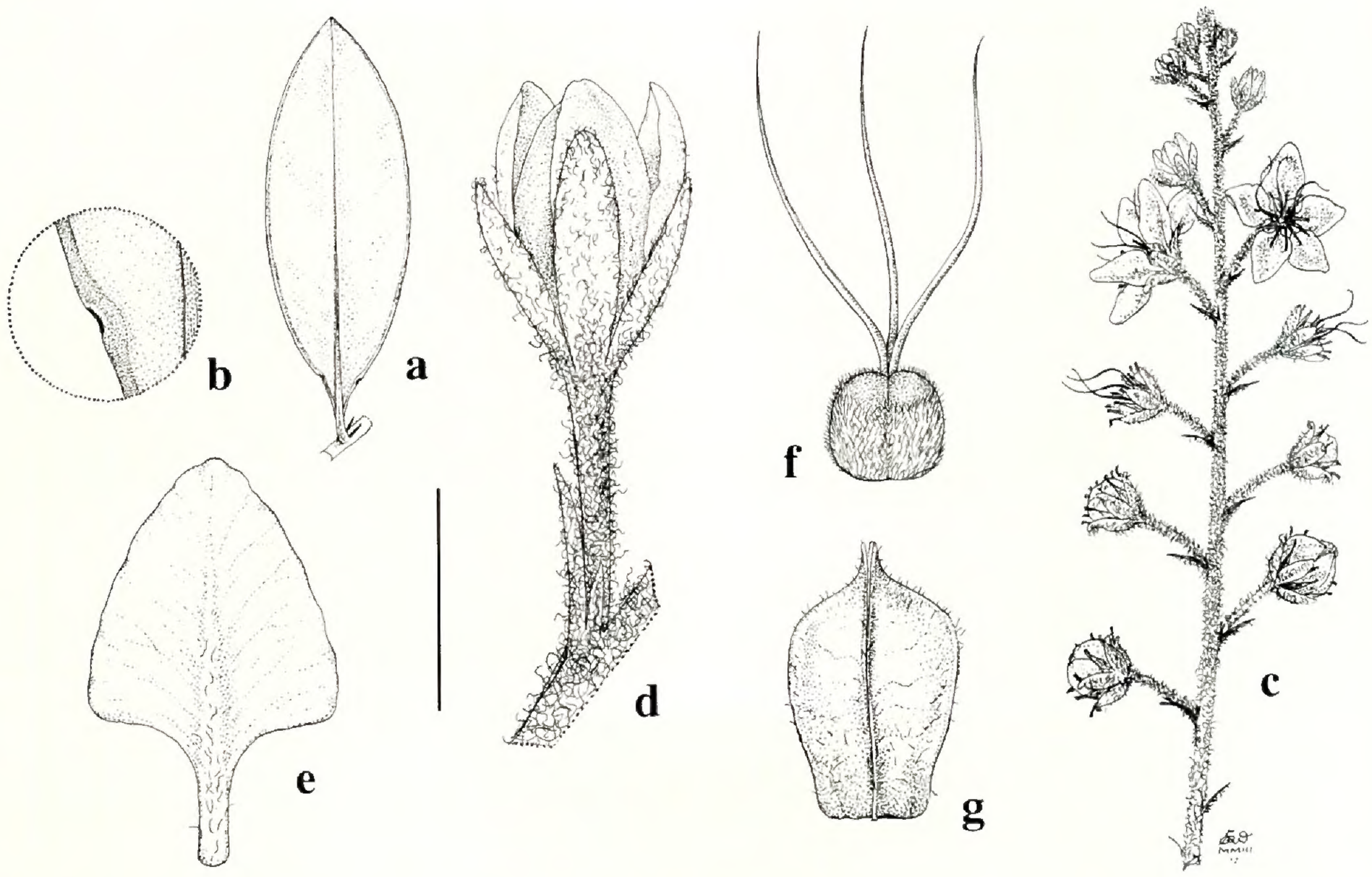


FIG. 1. *Galphimia amambayensis*. a. Leaf. b. Detail of lamina showing marginal gland. c. Portion of inflorescence. d. Opening bud borne on pedicel, with portion of inflorescence axis. e. Petal, abaxial view. f. Gynoecium. g. Coccus, abaxial view. Scale bar = a, 4 cm; b, 8 mm; c, 2 cm; d–g, 4 mm. (Based on *Fernández Casas & Molero 6190*.)

filaments opposite anterior-lateral petals 4–4.5 mm long, filaments opposite anterior-lateral sepals 3.5–4 mm long, filaments opposite posterior-lateral petals 4.5–5 mm long, filaments opposite posterior-lateral sepals 3.8–4.3 mm long, filament opposite posterior petal 4.8–5.2 mm long; anthers ca. 1.3 mm long. Ovary velutinous, but in the distal 1/3 only on the sutures and adjacent to them and glabrous on the surface; styles subequal (?), 5.5–6.5 mm long. Cocci ca. 4.5 mm long, ca. 3 mm in diameter, velutinous like the ovary but glabrescent in age.

*Galphimia amambayensis* is known only from the type collection from eastern Paraguay (Fig. 5). It is readily separated from the other three species by its dense tomentum on the calyx and inflorescence axes. The leaves are sparsely pubescent on both surfaces when young. The ovary is velutinous in a distinctive pattern: the vesture is present along the sutures but on the surfaces only in the proximal 2/3–3/4. In the type collection most of the petals are abaxially sprinkled with hairs but a few are apparently glabrous, though in these instances the hairs may have been broken off. Such petal pubescence occurs sporadically in some species of Malpighiaceae that usually have glabrous petals, and only additional collections of *G. amambayensis* can resolve whether pubescent petals are indeed characteristic of this species.

**Galphimia australis** Chodat, Arch. Sci. Phys. Nat., sér. 3, 24: 500. 1890. *Galphimia brasiliensis* var. *australis* (Chodat) Chodat, Bull. Soc. Bot. Genève, sér. 2, 9: 96. 1917.—TYPE: PARAGUAY. Guairá: Prairies de Cosme, entre Villa Rica et Caaguazú, Nov 1874, *Balansa 2393* (lectotype, here designated: G!; isolectotypes: K! P!).

*Galphimia brasiliensis* var. *pubescens* Adr. Juss. in A. St.-Hil., Fl. bras. merid. 3: 72. 1833 ["1832"].—TYPE: BRAZIL. Rio Grande do Sul: ad ripas Uruguay juxta vicum S.-Francisco de Borja [São Borja], Feb, *St. Hilaire C2, 2495bis* (holotype: P!).

*Galphimia australis* f. *angustifolia* Chodat, Mém. Soc. Phys. Genève 31(2:3): 23. 1892. *Galphimia brasiliensis* f. *angustifolia* (Chodat) Nied., Arbeiten Bot. Inst. Königl. Lyceum Hosianum Braunsberg 5: 22. 1914.—TYPE: PARAGUAY: Guairá: páturage d'Itangu, près de Villa-Rica, 17 Feb 1876, *Balansa 2394* (holotype: G!). Fig. 2.

Subshrubs or suffrutescent herbs to 1 m. Laminas of the larger leaves 2.5–7 (–8) cm long, (0.5–) 1–2.5 (–3.3) cm wide, length/width ratio 2.5–7 (–9), linear to linear-lanceolate to lanceolate to narrowly elliptical, apex apiculate, base acute; glabrous adaxially and abaxially, costa prominent abaxially, the secondary veins barely prominulous or not evident; margin entire; petioles (1.5–) 2–6 mm long, glabrous; leaf glands borne on the margin near the base of the lamina or to 0.8 cm above it, usually a pair, or sometimes with 1 or 2 additional glands, or sometimes only 1 gland or the glands absent, each gland 0.2–0.5 mm in diameter, circular, flush with the margin or prominent or sometimes with a stalk to 0.5 mm high; stipules (1.5–) 2–4.2 (–5) mm long, 0.5–1 mm wide, linear. Inflorescence a terminal raceme, the axes mostly tomentulose during anthesis, becoming glabrate in age, sometimes glabrous already at anthesis, sometimes the vesture retained in age; peduncles absent or rudimentary, sometimes to 1.5 (–2.5) mm long; pedicels 2–5 (–10) mm long, usually tomentulose or at least with some scattered hairs but sometimes glabrous; bracts 1–5 (–7) mm long, 0.4–1.2 mm wide, linear to narrowly triangular, bracteoles 0.5–1.5 (–2) mm long, 0.2–0.5 (–0.7) mm wide, linear, bracts and bracteoles abaxially glabrous. Sepals 2.5–3.5 (–4) mm long, 1–1.8 mm wide, oblong, glabrous, glands 0.2–0.5 mm in diameter, sessile, mostly 1 but sometimes 2 glands borne in the sinus at the base of 2 sepals, or glands absent. Petals deciduous, subequal, the posterior petal sometimes a little larger, yellow, becoming red in age; claw 1.3–1.5 (–1.7) mm long, limb 3–5 mm long, 2.5–4 mm wide, triangular-ovate, base acute to truncate, apex obtuse. Stamens with heteromorphic filaments but subequal anthers; filament opposite anterior sepal 2.5–3 (–3.4) mm long, filaments opposite anterior-lateral petals 2–2.3 (–2.5) mm long, filaments opposite anterior-lateral sepals 2.3–2.5 (–3) mm long, filaments opposite posterior-lateral petals 1.8–2 (–2.5) mm long, filaments opposite posterior-lateral sepals 2–2.3 (–3) mm long, filament opposite posterior petal (1.8–) 2–2.2 (–2.5) mm long; anthers 1–1.2 mm long. Ovary glabrous; styles subequal but the anterior two always a little longer than the posterior one, anterior styles 3.8–4.6 (–5.2) mm long, posterior style 3.5–4.2 (–5) mm long. Cocci 3–3.8 mm long, 2–2.5 mm in diameter, glabrous.

Phenology. Collected in flower and fruit throughout the year.

Distribution (Fig. 3). Southern Brazil, adjacent Bolivia, Paraguay, northeastern Argentina, western Uruguay; open woodlands and grasslands, cerrado, caatinga, campo limpo, campo sujo, matorral, and secondary sites; 90–900 m.

REPRESENTATIVE SPECIMENS. **Argentina.** CORRIENTES: Depto. Santo Tomé, Playadito 17 km W of Apóstoles, *Anderson 12362* (CAS, MBM, MICH, NY); Depto. Santo Tomé, Ayo. Chimiray, *Krapovickas & Cristóbal 25195* (CTES); Depto. Mercedes, Mercedes, a Itá Corá, Ayo. Pay-Ubre, *Quarín & González 2036* (CTES, ENCB); Depto. Berón de Astrada, 46 km W de Itá Ibaté, Valencia, *Schinini 14017* (CTES, F, MICH).—ENTRE RÍOS: Depto. Concordia, Parque Rivadavia, *Burkart & Troncoso 27703* (NY); Depto. Federación, Santa Ana, barranca del Río Uruguay, *Burkart et al. 29359* (CTES, GH); Concepción del Uruguay, *Lorentz 563* (BM, F, G, GH, K).—MISIONES: 9 km al NW de Concepción de la Sierra, *Krapovickas et al. 15148* (C, CTES, MBM, MO, P, WIS); Depto. Caniguás, Puerto Rico, *Montes 3995* (CTES, MICH); Depto. Apóstoles, Apóstoles, *Xifreda & Maldonado 381* (MBM). **Bolivia.** SANTA CRUZ: Prov. Velasco, San Ignacio, 100 km N comunidad San Miguelito, *Bruderreck 24* (CTES, NY); Prov. Ñuflo de Chávez, Embocada del Carmen, ca. 40 km SSW de Concepción, 16°38'S, 62°26'W, *Krapovickas & Schinini 32151* (CTES, F, MBM, MICH); Prov. Sandoval, San Matías, 16°21'S, 58°26'W, *Krapovickas & Schinini 36157* (CTES, MICH); Prov. Andrés Ibáñez, Jardín Botánico de Santa Cruz, 12 km E of center of Santa Cruz on road to Cotoca, *Nee 44434* (NY); Prov. Sara, lomería de Buena Vista, *Steinbach 7370* (A, BM, F, G, GOET,

FIG. 2. *Galphimia australis*. a. Habit. b. Node with stipules and basal portions of leaves. c. Bud borne on pedicel, with portion of inflorescence axis; note calyx glands. d. Flower and detail showing petal apex. e. Distal portions of stamens, abaxial (left) and adaxial (right) views. f. Gynoecium. g. Style apex. h. Fruit subtended by calyx and filaments. i. Coccus, abaxial view. j. Coccus, adaxial view. k. Seed. l. Embryo. Scale bar = a, 4 cm; b, 8 mm; c, f, 4 mm; d, 5 mm (apex 4 mm); e, 2.3 mm; g, 0.4 mm; h–j, 5 mm; k, l, 2.8 mm. (Based on: a–g, *Schinini 14017*; h–l, *Krapovickas & Schinini 32151*.)

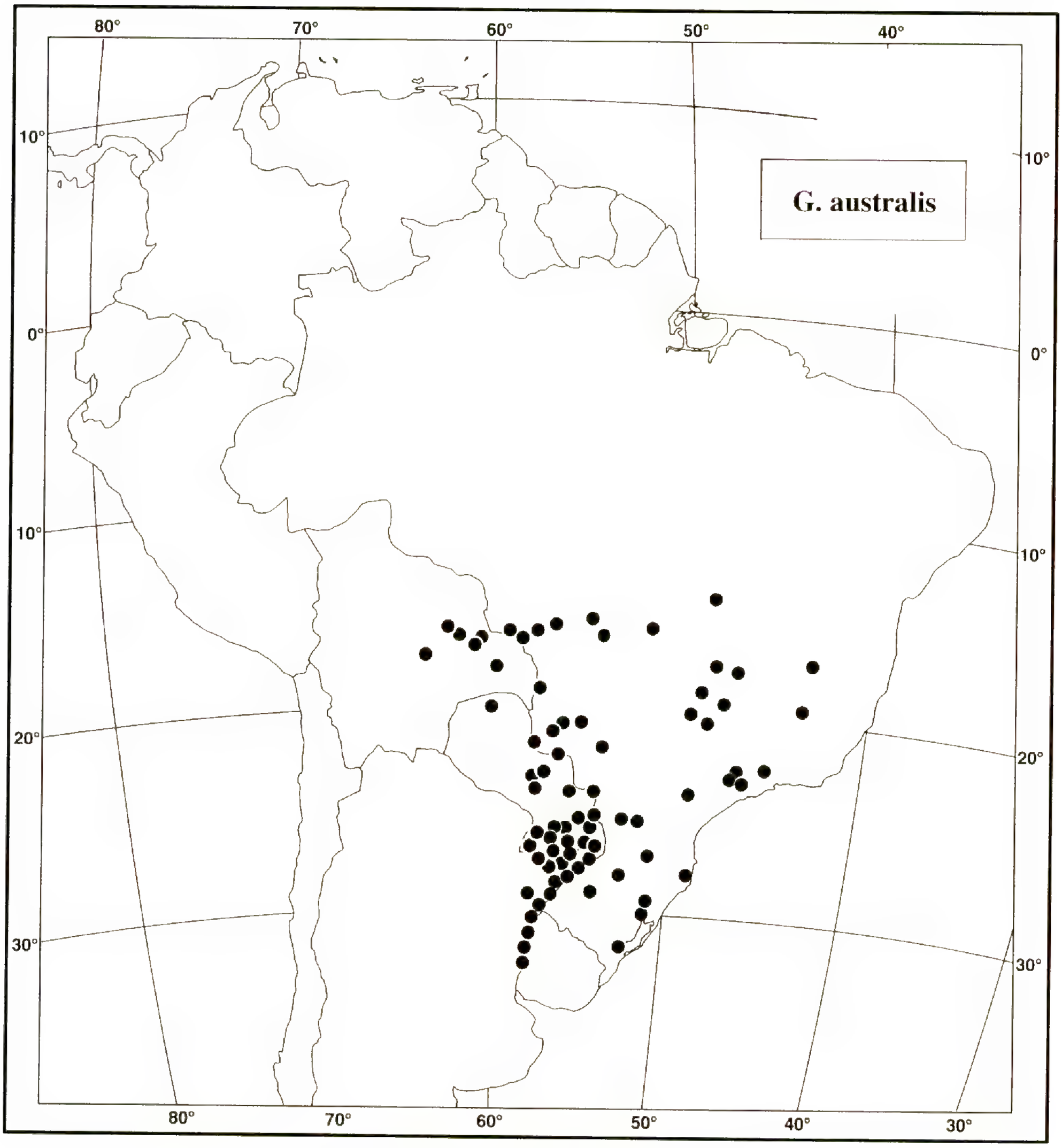


FIG. 3. Distribution of *Galphimia australis*.

MO, S). **Brazil.** Goiás: Mpio. Caldas Novas, 12 km due W of the city of Caldas Novas, *Heringer & Eiten 14190* (HB, K, MO, SP, UB); BR-158, 5 km SE de Aragarças, *Krapovickas & Cristóbal 42948* (K, MBM, MICH).—Mato Grosso: Oasis, 47 km E de Cáceres, BR-070, Km 680, Serra das Araras, *Krapovickas et al. 40260* (MICH); Mpio. Cuiabá, Rod. BR-070, Contorno Sul, *Hatschbach 65660* (MBM).—Mato Grosso do Sul: Mpio. Campo Grande, Rio Anhandui, *Hatschbach 21813* (MBM); Mpio. Rio Brilhante, Rod. BR-267, entroncamento, *Hatschbach 25071* (MBM); Bela Vista, 10–15 km O, *Hatschbach 49160* (BR, G, MBM, US); Mpio. Porto Murtinho, Rod. Bonito–Campo dos Indios, Fazenda Agua Doce, *Hatschbach et al. 74009* (MICH); Mpio. Rio Verde, base escarpa de la Serra Alegre, ca. 20 km N de Rio Verde, *Krapovickas 29878* (CTES).—Minas Gerais: ca. 5 km SE of Paracatú, *Irwin et al. 26193* (F, MICH, MO, NY); estrada Santo Hipólito a Diamantina, Km 69, *Shepherd et al. 3837* (MBM, NY).—Paraná: Ibaré opp., Morungava praedium, *Dusén 17413* (GH, MO, S); Km 127, Mpio. Laranjeiras do Sul, *Hatschbach 23123* (MBM, MICH).—Rio Grande do Sul: BR-101, Km 6, Campo Bonito, ca. 8 km SW de Torres, *Krapovickas & Cristóbal 38484* (CTES, MICH); I. A. S., Pelotas, *Costa Sacco 407* (F, HB, NY).—Santa Catarina: Rod. BR-470, Km 354, Mpio. Campos Novos, *Poliquesi 495* (CEPEC, CTES, MBM, UB).—São Paulo: Dist. Rubião Junior, 1–2 km SW da Faculdade de Ciências Médicas e Biológicas de Botucatu, *Gottsberger & Campos 14-301072* (F, MBM, MICH, UB); Jales, Pastos de Retiro, *Hoehne SPF13903* (MBM, RB). **Paraguay.** Alto Paraná: Ea. Santa Elena, Pira Pyta, *Schinini & Caballero M. 27152* (G, MICH).—Amambay: 32 km SE de Bella Vista, Ayo. Negla, *Schinini 21495* (F, G, MICH).—Caaguazú: Colonia Pindo, camino

entre Itaquyry y Curuguati, 24°35'N, 55°20'W, *Schinini & Caballero M. 30243* (MICH).—Canendiyú: iter ad Yerbales montium Sierra de Maracayú, in regione fluminis Corrientes, *Hassler 4524* (BM, F, G, GH, K, NY, W).—Concepción: prope Concepción, *Hassler 7572* (BM, G, K, NY).—Cordillera: Piribebuy, Colonia Pedro Pablo Caballero, *Rojas 12731* (S, W).—Guairá: Iturbe, *Montes 12595* (CTES, MICH).—Itapúa: Capitán Miranda, 4.2 km N del Hotel Tirol detrás del Barrio CONAVI, *Krapovickas & Cristóbal 44463* (CTES, G, MICH).—Misiones: 16–17 km S de Santa Rosa, camino a General Delgado, *Arbo et al. 6141* (G, MICH).—Ñeembucú: San Juan Bautista, *Purvey 390* (CTES, MO).—Paraguarí: National Park Ybycu'i, NW corner of park along Arroyo Mina, 26°01'S, 56°46'W, *Zardini & Tillería 28962* (MO).—Presidente Hayes: Primavera, *Woolston 192* (NY, S). **Uruguay.** Paysandú: Chapicuy, orillas del Río Uruguay, Sta. Sofia, *Rosengurtt B-3278 1/2* (GH, MO, SP).

*Galphimia australis* is a widespread and variable species found from central Brazil to Bolivia and eastern Argentina. It is distinguished by glabrous leaves borne on very short petioles (to 6 mm long) and small flowers with a glabrous calyx and ovary. Although the youngest branchlets and inflorescence axes are pubescent, the vesture is soon shed and the more mature parts are usually glabrate to glabrous. In specimens from Rio Grande do Sul (Brazil) the vesture is retained in the racemes and leafy branches, and only the oldest vegetative branches are essentially glabrous. This variant was named by Jussieu (1833) and accepted by Niedenzu (1914, 1928) as *G. brasiliensis* var. *pubescens*. Such exceptional populations with persistent vesture occur occasionally in other parts of the range as well (e.g., Argentina, *Lorentz 563*, Entre Ríos; *Xifreda & Maldonado 381*, Misiones) and are not accorded taxonomic recognition here.

Throughout most of the range *G. australis* bears narrow laminas, ranging from linear to linear-lanceolate to lanceolate to narrowly elliptical, that taper toward the apex and are 3–6 (–9) times as long as wide. Occasionally, some laminas on a specimen are only 2.5 times as long as wide. Chodat (1892) assigned specimens with very narrow leaves to his forma *angustifolia*, based on *Balansa 2394* from Paraguay. *Schinini 14017* and *Schinini et al. 23447*, both from Argentina, are two similarly narrow-leaved collections. In some populations some of the leaves or sometimes even all are wider than usual, and approach the leaf shape found in *G. amambayensis* and *G. platyphylla* (e.g., *Hassler 4524*, *Hatschbach 25071, 49160, Krapovickas 29878, Krapovickas & Cristóbal 25195*). These variants match *G. australis* in all other aspects.

**Galphimia brasiliensis** (L.) Adr. Jussieu in A. St.-Hilaire, Fl. bras. merid. 3: 71. 1833 ["1832"]. *Thryallis brasiliensis* L., Sp. pl., ed. 2, 2: 554. 1762.—Type: "Fruticescens herba pisonis. Margr. bras. 79. f. 3" [the illustration; p. 79, in Piso, G.: *De medicina brasiliensi*; Marcgrave, G.: *Historiae rerum naturalium brasiliae*, 1648.]

*Galphimia brasiliensis* var. *pubescens* f. *ovata* Nied., Arbeiten Bot. Inst. Königl. Lyceum Hosianum Braunsberg 5: 22. 1914.—Type: Brazil. Bahia: without locality, 1830, *Salzmann s.n.* (lectotype, here designated: G!; isolectotypes: MO! P!).

Fig. 4.

Subshrubs and shrubs to 1.5 m, often sprawling and scrambling; stems pubescent when young, becoming glabrous but often roughened by persistent tubercles. Vesture of all vegetative parts of straight to wavy, light brown to white hairs, 0.3–0.8 mm long, each hair borne on a persistent tubercle up to 0.25 mm high or the epidermis only slightly raised at point of attachment. Laminas of the larger leaves 2–5 cm long, 1–3.8 cm wide, ovate or elliptical, apex apiculate or acute, base acute to truncate, glabrous but often with a few scattered hairs on the abaxial costa and along the margin near the base, costa prominent abaxially, secondary veins prominulous or

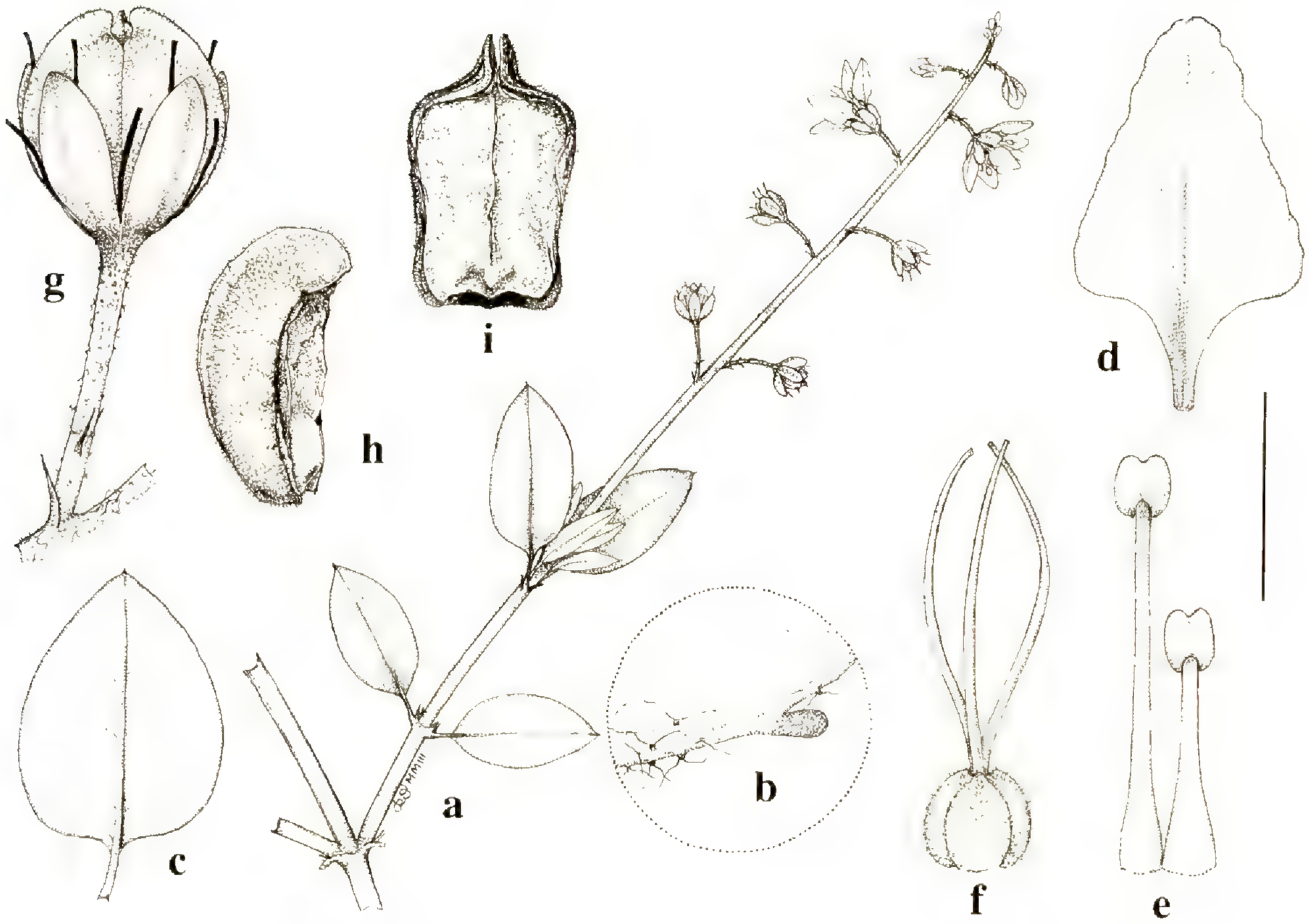


FIG. 4. *Galphimia brasiliensis*. a. Branch with inflorescence. b. Detail of lamina base, showing marginal gland. c. Leaf. d. Petal. e. Stamen opposing posterior-lateral sepal (left) and stamen opposing posterior petal (right); abaxial view. f. Gynoecium. g. Fruit, subtended by calyx and filaments, borne on pedicel and peduncle, with portion of inflorescence axis. h. Coccus, lateral view. i. Coccus, adaxial view. Scale bar = a, c, 2 cm; b, 1 mm; d, h, i, 2.7 mm; e, f, 2 mm; g, 4 mm. (Based on: a, d–g, *Anderson 11737*; b, c, *Harley 16312*; h, i, *Blanchet 3904*.)

barely so abaxially; margin entire or commonly with a few persistent tubercles near the base; petioles 0.3–1 cm long, tuberculate-strigose or only the tubercles remaining; leaf glands borne on the margin, to 6 mm above the base of the lamina, usually a pair, or sometimes with only 1 gland or the glands absent, each gland 0.1–0.3 mm in diameter, disklike and prominent or sometimes drawn out into a tooth to 0.3 (–0.5) mm long; stipules 1.5–2.7 mm long, 0.3–0.6 wide, linear or very narrowly triangular. Inflorescence a terminal raceme, the axes tuberculate and strigose; peduncles 0.4–2 (–3) mm long, glabrate, pedicels 2.5–5.5 mm long, strigose; bracts 1.2–2 mm long, 0.4–0.5 mm wide, linear, bracteoles 0.5–0.8 mm long, 0.3–0.4 mm wide, linear. Sepals ca. 2.5 mm long, 1–1.1 mm wide, narrowly elliptical, glabrous or with scattered hairs at the base, usually with a tuft of hairs at the apex, glands absent. Petals deciduous, subequal but the posterior petal sometimes with a wider claw than the lateral ones, yellow, often marked with red, becoming pink/red in age; claw 0.5–1 mm long, 0.4–0.5 mm wide, limb ca. 4 mm long, ca. 3 mm wide, triangular-ovate, base acute. Stamens with heteromorphic filaments but subequal anthers; filaments of stamens opposing lateral sepals 3.2–3.3 mm long, of stamen opposing anterior sepal ca. 3.5 mm long, filaments of stamens opposing petals subequal, ca. 2 mm long; anthers 0.7–0.8 mm long, cylindrical. Ovary velutinous; styles subequal, 3.3–4.3 mm long. Cocci ca. 3.6 mm long, ca. 2 mm in diameter, velutinous.

Phenology. Collected in flower and fruit throughout the year.

Distribution (Fig. 5). Eastern Brazil (Bahia, Paraíba, Pernambuco, and adjacent Piauí); in caatinga, cerrado, at edges of woods and gallery forests, in thorn scrub; 280–1150 m.

FIG. 5. Distribution of *Galphimia amambayensis, G. brasiliensis,* and *G. platyphylla.*

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** BAHIA: 10 km W of Serrinha on rd to Conceição do Coité, 11°38'S, 39°W, *Anderson 11737* (CAS, MBM, MICH, NY); Valente, 6 km N of Valente on rd to Santaluz, *Anderson 13689* (MICH); camino de Filadélfia a Pindobaçu, a 14 km de la BR-407, 10°48'S, 40°14'W, *Arbo et al. 7334* (CEPEC); BR-324, 12 km NW de Jacobina, camino a Umburanas, 11°06'S, 40°36'W, *Arbo et al. 7359* (CEPEC); Iaçu, Fda. Lapa, 12°42'S, 39°56'W, *Arouck-Ferreira 256* (MBM); Pasto Barreiro, Faz. Serra da Monta, Itaberaba, *Bastos 162* (CEPEC, MICH); without locality, *Blanchet 1046* (G), *2184* (BM, G), *3904* (BM, F, G); Serra da Jacobina, *Blanchet 2674* (BM, BR, C, G, MO, NY, P, W); Conceição de Feira, margem esquerda do Rio Paraguaçú, 12°32'35"S, 39°03'06"W, *Carvalho et al. 544* (CEPEC, MICH); Barragem de Bananeiras, cachoeira, vale dos rios Paraguacú e Jacuipé, 12°32'S, 39°05'W, *Cavalo 201* (CEPEC, MICH); entre Jeremoabo e Paulo Afonso, *Gonçalves 41* (CEPEC); Lagôa de Eugenia, southern end near Camaleão, *Harley 16227* (CEPEC); 64 km N of Senhor do Bonfim on BA-130 to Juazeiro, 09°55'S, 40°15'W, *Harley 16312* (K, MICH, MO, NY, RB); Serra da Jacobina, 8 km N of Senhor do Bonfim on BA-130 to Juazeiro, 10°23'S, 40°15'W, *Harley 16500* (K, MICH, MO, NY); Piatã, *Harley 24152* (K); Itaberaba, Fda. Morros, *Hatschbach 1986* (MO); Milagres, arredores, *Hatschbach 42452* (MBM, MICH); Itaberaba, Fda. Morros, *Hatschbach 48206* (BR, CEPEC, MBM, MICH); Morro da Garrafa, 12°45'18"S, 39°51'W, *Melo et al. 2043* (CEPEC); Pasto Buffel, Faz. Serra da Monta, Itaberaba, *Oliveira 544* (MO); Mairí, *Oliveira 647* (MO); Faz. Lagôa do Canto, Ipira, *Oliveira 682* (MO); Faz. Várzea Ipirá, *Oliveira 713* (CEPEC, MO); Santa Terezinha, 0.6 km NE de Sta. Terezinha, na estrada entre Sta. Terezinha e Monte Cruzeiro, 12°48'56"S, 39°32'05"W, *Queiroz et al. 1540* (CEPEC, F, MBM); Santa Inês, Km 20 da Rod. Ubaíra/Sta. Inês, *Santos*

*3070* (CEPEC, MICH); bei Remonso, *Ule 7180* (G); Santa Luz, 30 km W of Queimadas, 15 km NW of Santa Luz, 11°09'S, 39°28'W, *Webster 25670* (CAS, MICH).—PARAÍBA: without locality, *Coêlho de Moraes 2116* (A, NY, S).—PERNAMBUCO: Sertânia, Fazenda Coxi, *Alencar 3* (MICH); Area-projeto Suape, Cabo de Sto. Agostinho, parte anterior (Estação D), *Andrade-Lima & Medeiros-Costa 48* (F); Cabo, Area-projeto Suape, Cabo de Santo Agostinho, *Andrade-Lima & Medeiros-Costa 48* (MBM); near Pernambuco, *Gardner 944* (BM, GH, NY, S, W); 20 km de Petrolina em direção a Afrânio, *Heringer et al. 185* (UB); 20 km de Petrolina a Afrânio, *Heringer et al. 975* (RB); without locality, *Houllet s.n.* (BR); Olinda, *Pickel 676* (SP); without locality, *Ridley et al. s.n.* (BM); Alagoinha, SW von Caruarú, *Vogel 129* (MICH).—PIAUÍ: Lagôa Comprida, *Gardner 2077* (BM, GH).

*Galphimia brasiliensis* is characterized by the "tuberculate-strigose" vesture, the mostly ovate leaves, and a uniformly velutinous ovary and fruit. The androecium is also distinctive in that the filaments of stamens opposing the petals are only 2/3 as long as those of stamens opposing the sepals. The hairs of vegetative parts are borne on small tubercles, which persist after the hair is sloughed off, so that the stems, axes, petioles, pedicels, and even the abaxial costa and margins of laminas are often tuberculate. Such tubercles are also found in the Mexican species *G. arenicola* C. Anderson, *G. hirsuta* Cav., and *G. tuberculata* (Rose) Nied. The glands of larger laminas are sometimes drawn out into a tooth (Fig. 4b).

**Galphimia platyphylla** Chodat, Arch. Sci. Phys. Nat., sér. 3, 24: 500. 1890. *Galphimia brasiliensis* var. *platyphylla* (Chodat) Nied. in Chodat & Hassl., Bull. Herb. Boissier, sér. 2, 7: 294. 1907. *Galphimia brasiliensis* f. *platyphylla* (Chodat) Nied., Arbeiten Bot. Inst. Königl. Lyceum Hosianum Braunsberg 5: 22. 1914.—TYPE: PARAGUAY. Caaguazú: dans les campos, Caaguazú, Nov 1874, *Balansa 2396* (holotype: P!; isotype: G!). Fig. 6.

Subshrubs to 0.5 m, from a woody caudex; stems sparsely pubescent when young, soon becoming glabrous. Vesture of all vegetative parts of mostly wavy or crisped but sometimes straight, reddish brown hairs 0.2–0.7 mm long. Laminas of the larger leaves 3–7.5 cm long, (1.5–) 2–4 (–5) cm wide, length/width ratio 1.2–2.3 (–3), elliptical to lanceolate to ovate to broadly ovate, occasionally suborbicular, obtuse or acute or sometimes apiculate, acute to truncate, glabrous adaxially and abaxially, costa prominent abaxially, the secondary veins barely prominulous or not evident; margin entire; petioles 1.5–6 mm long; leaf glands borne on the margin near the base of the lamina or to 0.5 cm above it, usually a pair, or sometimes with 1 or 2 additional glands, or sometimes only 1 gland or the glands absent, each gland 0.2–0.5 mm in diameter, circular and prominent; stipules 2–4 mm long, 0.6–1.2 mm wide, triangular to narrowly so. Inflorescence a terminal raceme, the axes mostly tomentulose during anthesis; peduncles absent; pedicels 1.5–8 mm long, glabrous; bracts 1–5 (–7) mm long, 0.4–1.2 mm wide, linear to narrowly triangular, bracteoles 0.5–1.5 (–2) mm long, 0.2–0.5 (–0.7) mm wide, linear, bracts and bracteoles abaxially glabrous. Sepals 4–5.7 mm long, 2–2.5 mm wide, elliptical or sometimes oblong, glabrous, glands 0.3–0.6 mm in diameter, each borne in the sinus at the base of 2 sepals, or occasionally glands absent. Petals deciduous, subequal, the posterior petal sometimes a little larger, yellow, becoming red in age; claw 2–2.5 mm long, limb 7–8.5 mm long, (4–) 5–5.5 mm wide, triangular-ovate, base acute to truncate, apex obtuse. Stamens with heteromorphic filaments but subequal anthers; filament opposite anterior sepal 3.3–4.5 mm long, filaments opposite anterior-lateral petals 2.7–3.5 mm long, filaments opposite anterior-lateral sepals 3–4 mm long, filaments opposite posterior-lateral petals 2.5–3.3 mm long, filaments opposite posterior-lateral sepals 2.8–3.7 mm long, filament opposite posterior petal 2.5–3.5 mm long. Ovary glabrous; styles subequal, 4.2–5.3 mm long. Cocci 4–5 mm long, 3–3.7 mm in diameter, glabrous.

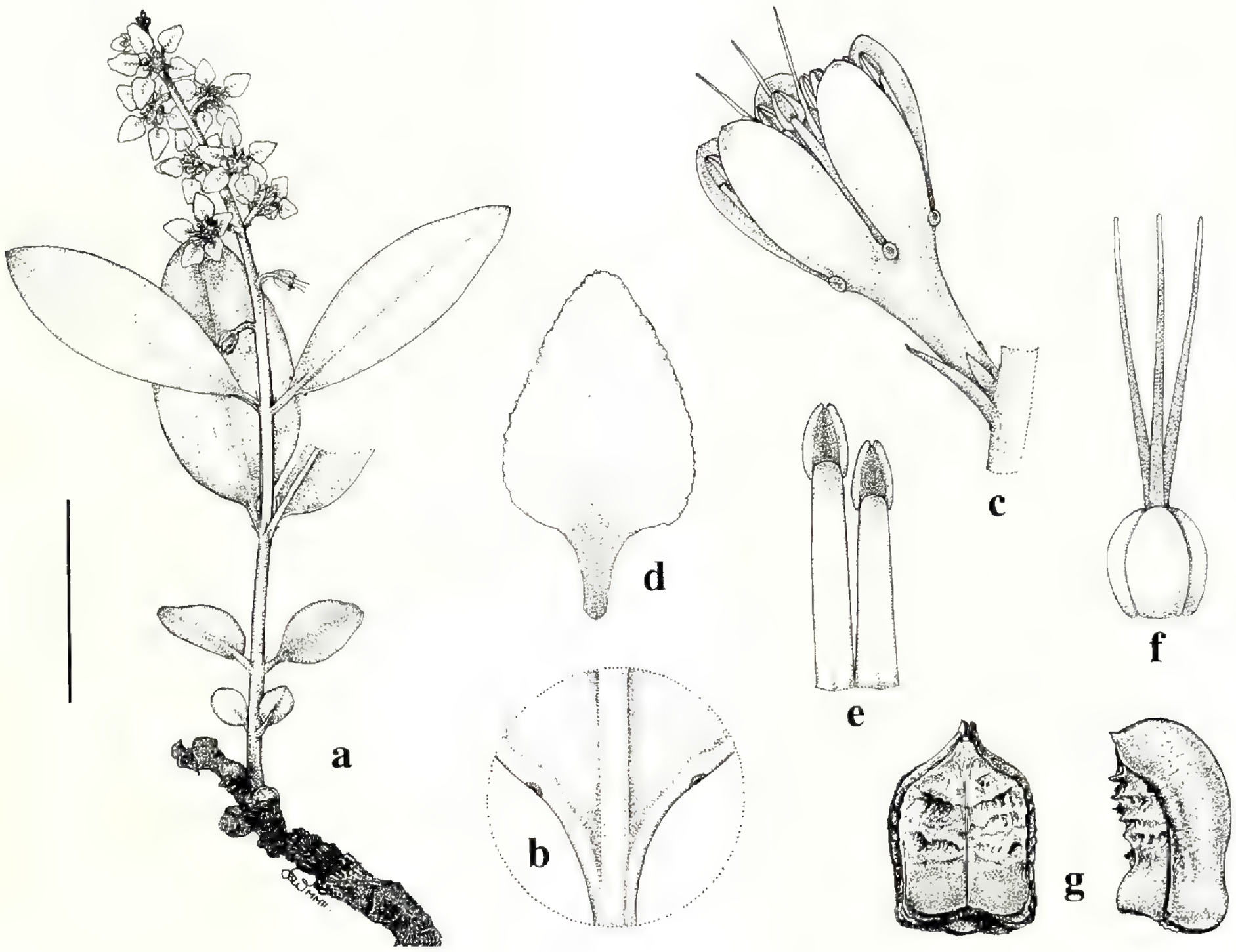


FIG. 6. *Galphimia platyphylla*. a. Habit. b. Lamina base, showing marginal glands. c. Old flower (the petals fallen) borne on pedicel, with portion of inflorescence axis; note calyx glands. d. Petal. e. Stamen opposing posterior-lateral sepal (left) and stamen opposing posterior petal (right); abaxial view. f. Gynoecium. g. Two cocci, adaxial view (left) and lateral view (right). Scale bar = a, 4 cm; b; 8 mm, c, d, 5 mm; e, f, 2.7 mm; g, 4 mm. (Based on: a–c, *Hassler 9132*; d–f, *Pedersen 14726*; g, *Krapovickas et al. 45943*.)

Phenology. Collected in flower and fruit in March and from July through December.

Distribution (Fig. 5). Eastern Paraguay (Amambay, Caaguazú, Canendiyú) and adjacent Brazil (Mato Grosso do Sul); campo, cerrado, campo limpo, open woodlands; 300–400 m.

Additional Specimens Examined. **Brazil.** Mato Grosso do Sul: Mpio. Camapuã, Capão Redondo, *Hatschbach 33058* (MBM, NY); Mpio. Ponta Porã, Pacori, *Hatschbach 45921* (BR, G, MBM, MICH); Amambai, rod. p/ Ponta Porã, *Hatschbach 48498* (MBM, MICH); Coxim, 5 km S, *Oliveira 162* (MBM); Mpio. Guia Lopes de Laguna, on rd (BR-267) from Maracajú to Guia Lopes, ca. 12 km W of Ervania, *Pedersen 14726* (C, MICH). **Paraguay.** Amambay: Sierra de Amambay, *Hassler 9884* (BM, G, NY, W); alrededores de Pedro Juan Caballero, ruta 5, *Krapovickas et al. 45943* (CTES, G, MICH).—Caaguazú: prope Caaguazú, *Hassler 9132* (BM, F, G, GH, K, NY, P, S, W); Ruta 2, Pastoreo, Km A-197, *Krapovickas & Cristóbal 13355* (CTES); camino a Ihú, 14 km N de Caaguazú, *Schinini et al. 28326* (CTES); Cnia. Pindo, camino entre Itaquyry y Curuguati, *Schinini & Caballero M. 30112* (CTES, MICH); near J. E. Estigarribia, *Zardini & Guerrero 49141* (MICH).—Canendiyú: in regiones Yerbalium de Maracayú, Apepú et Tajaiaguay [?], *Hassler 4327* (BM, F, K, NY, P, W); iter ad Yerbales montium Sierra de Maracayú, in regione fluminis Capibary, *Hassler 4393* (BM, G, W); Mbaracayú Natural Reserve, around Aguará-Ñú, *Zardini & Ramírez B. 51023* (MO).— Depto. unknown: "Alto Paraná," 22–23°S, *Fiebrig 6348* (G).

*Galphimia platyphylla* is distinctive in its thick and broad leaves. The laminas range from broadly elliptical or broadly lanceolate to broadly ovate or even suborbicular, are only 1.2–2.3 times as long as wide, and often have an obtuse apex. Compared to

*G. australis*, the flowers and fruits are larger, and the plants are apparently shorter (to 0.5 m vs. to 1 m tall) and more robust, i.e., the axes tend to be stouter. Future fieldwork may uncover ecological differences between these two species.

### Excluded Name

*Galphimia pubescens* (Adr. Juss.) Herter, Fl. illustr. Uruguay 14(11): 491. 1956.—The combination is not validly published, because Herter did not cite the basionym (Article 33.3).

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# TWO NEW SPECIES OF GALPHIMIA (MALPIGHIACEAE), AND A KEY TO THE MEXICAN SPECIES WITH DECIDUOUS PETALS

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ABSTRACT. *Galphimia mirandae* and *G. oaxacana*, two new Mexican species with deciducous petals, are described and illustrated. A key to all 14 Mexican species of *Galphimia* with deciduous petals is presented.

## INTRODUCTION

*Galphimia* Cav. (Malpighiaceae) comprises ca. 20 species of large herbs, shrubs, and treelets, all but four occurring in Mexico. Species of *Galphimia* have yellow petals, often suffused with red. The petals are deciduous in most species, but in those grouped in the *G. glauca* complex the petals become stiff and spreading, and are persistent. The calyx lacks the oil glands that are found in most genera of New World Malpighiaceae; however, in a few species a small gland, which resembles the leaf glands, is borne at the base of the sinus of some or all adjacent sepals (Castro et al. 2001). The fruit is a schizocarp breaking into three cocci. The genus is placed in the tribe Galphimieae, along with *Lophanthera* Adr. Juss., *Spachea* Adr. Juss., and *Verrucularia* Adr. Juss. (W. R. Anderson 1978; Cameron et al. 2001; Davis et al. 2001). Many species included in *Galphimia* were first described in *Thryallis* L. or were transferred to it; however, the name *Thryallis* Mart. is conserved over *Thryallis* L. (C. Anderson 1995, 2003), and *Galphimia* Cav. is the correct name for this genus.

A few of the Mexican species with deciduous petals are aptly named and easily recognized, e.g., *G. angustifolia*, *G. sessilifolia*, *G. vestita*; however, most species are less distinctive, and the name "*G. gracilis*" is widely misapplied to them. *Galphimia gracilis* occurs in Tamaulipas and Veracruz, as well as in adjacent regions of Hidalgo, Puebla, Querétaro, and San Luis Potosí. It is also widely cultivated as an ornamental in warm regions worldwide. A recent review of the Mexican collections of *Galphimia* revealed three undescribed species among material that was associated with *G. langlassei* (C. Anderson 2003), and two additional novelties, *G. mirandae* and *G. oaxacana*, are described here.

A key is presented below to aid in the correct identification of the 14 Mexican species with deciduous petals. Commonly encountered synonyms for some names are noted in brackets.

## NEW SPECIES

**Galphimia mirandae** C. Anderson, sp. nov.—TYPE: MEXICO. Puebla: Mpio. Tehuitzingo, 12 km al NW de El Pitayo, carr. a Izúcar de Matamoros, 1350 m, 28 Jul 1983, *Torres C. 3296* (holotype: MEXU!; isotype: MBM!). Fig. 1.

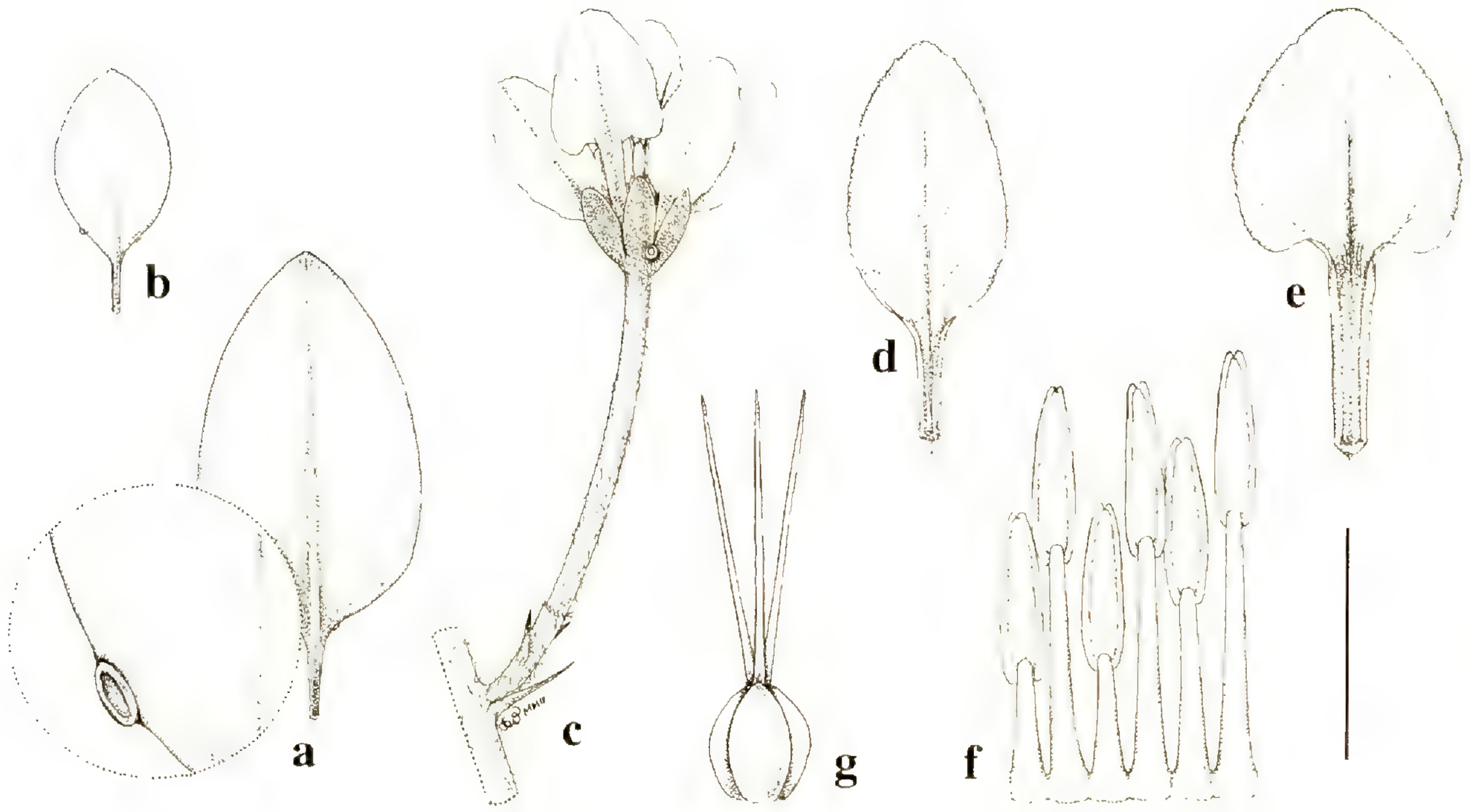


FIG. 1. *Galphimia mirandae*. a. Leaf with ovate lamina; detail of base of lamina, showing marginal gland. b. Leaf with elliptical lamina. c. Flower borne on pedicel and peduncle, with portion of inflorescence axis; note calyx gland. d. Lateral petal. e. Posterior petal. f. Abaxial view of six stamens; outermost stamen at left opposes posterior petal, outermost stamen at right opposes anterior sepal. g. Gynoecium. Scale bar = a, 4 cm, inset 4 mm; b, 4 cm; c, 1 cm; d, e. 5.7 mm; f, g, 4 mm. (Based on: a, *Miranda 2147*; b–g, *Torres C. 3296*.)

Frutex vel arbor parva. Laminae 3–6.5 cm longae, 2–4 cm latae, ellipticae vel ovatae vel obovatae vel rhombicae, glabrae, succulentae, margine integra, glandibus 0.5–1 mm diametro, sessilibus; petioli 0.5–1 cm longi; stipulae 2–4 mm longae. Inflorescentia racemosa. Petala decidua; petala lateralia ungue 2.5–2.8 mm longo, 0.5 mm lato, limbo 7–8.5 mm longo, 4.5–5.5 mm lato, elliptico vel anguste triangulari; petalum posticum ungue 4–4.2 mm longo, 1–1.2 mm lato, limbo 6.2–7.5 mm longo, 6–7 mm lato, triangulari vel interdum suborbiculari. Antherae 3.3–3.7 mm longae. Ovarium glabrum vel suturis pubescens; styli anteriores 6–6.6 mm longi, stylus posticus 5–5.7 mm longus. Fructus ignotus.

Shrub or treelet to 4 m, stems tomentulose, soon glabrescent to glabrous. Vesture of all vegetative parts of sessile, wavy to crisped, reddish brown hairs 0.4–1 mm long. Laminas of the larger leaves (1.5–) 3–6.5 cm long, (1–) 2–4 cm wide, elliptical to broadly so, obovate, rhombic, or ovate, apex obtuse to acute, base acute to decurrent (especially in larger leaves), glabrous, succulent, costa prominent abaxially, secondary veins prominulous or not evident; margin entire; petioles 0.5–1 cm long, glabrous; leaf glands commonly a pair, borne on the margin of the lamina well above or at the base, if base decurrent then superficially appearing placed on the petiole, sometimes 1 or more additional glands borne on the margin of the lamina, each gland discoid and with a thick rim, 0.5–1 mm in diameter; stipules 2–4 mm long, 0.7–1.2 mm wide, narrowly triangular. Inflorescence a terminal raceme, the axes, peduncles, and pedicels tomentulose but becoming sparsely so in age; peduncles 3–6 mm long, pedicels 14.5–18.5 mm long, the pubescence often concentrated in a line, with a ring of hairs at the articulation, peduncles 0.2–0.3 times as long as pedicels; bracts 2.5–3.2 mm long, 0.5–0.8 mm wide, bracteoles 1.5–2 mm long, 0.3–0.5 mm wide, bracts and bracteoles linear, abaxially glabrous or with a few scattered hairs; bracteoles borne at about the middle of the peduncle, subopposite or up to 0.3 mm apart. Sepals 3.5–4.2 mm long,

1–1.5 mm wide, narrowly ovate to oblong, glabrous or at the apex red-ciliate, glands absent or rarely with a gland 0.5 mm in diameter. Petals deciduous, unequal, yellow; lateral petals: claw 2.5–2.8 mm long, 0.5 mm wide, limb 7–8.5 mm long, 4.5–5.5 mm wide, elliptical or narrowly triangular; posterior petal: claw 4–4.2 mm long, 1–1.2 mm wide, limb 6.2–7.5 mm long, 6–7 mm wide, triangular or sometimes suborbicular. Stamens with heteromorphic filaments but subequal anthers; filament opposite anterior sepal 4–4.5 mm long, filaments opposite anterior-lateral petals 3–3.2 mm long, filaments opposite anterior-lateral sepals 3.7–4 mm long, filaments opposite posterior-lateral petals 2–2.2 mm long, filaments opposite posterior-lateral sepals 3.6–4 mm long, filament opposite posterior petal 2–2.3 mm long; anthers 3.3–3.7 mm long, tapered from the base to the apex. Ovary glabrous or with a row of hairs along the sutures in the proximal 2/3–4/5, sometimes only with a few hairs scattered along the sutures; styles unequal, anterior styles 6–6.6 mm long, posterior style 5–5.7 mm long. Mature fruit not seen.

Additional Specimens Examined. **Mexico.** Guerrero: 8 km al NW de Chilpancingo, sobre la carretera a Chichihualco, 1350 m, 7 Jul 1966, *Asteinza* (ENCB), *M. Cabrera s.n.* (ENCB), *Rzedowski 22755* (DS, ENCB, MICH, TEX).—Puebla: [Izúcar de] Matamoros, 24 Jul 1942, *Miranda 2147* (MEXU).

*Galphimia mirandae* is recognized by its succulent laminas with large, thick-rimmed glands on the margin; if the base is decurrent the glands may at first glance appear to be borne on the petiole, but careful examination shows them embedded in the laminar tissue. The pedicels are quite long (14.5–18.5 mm), and the anterior styles slightly exceed the posterior one. The label data for the type collection include the note "suelo pedregoso"; perhaps this species is associated with substrates derived from volanic deposits.

This species is named for the eminent Mexican botanist Faustino Miranda (1905–1964), who first collected it.

**Galphimia oaxacana** C. Anderson, sp. nov.—Type: Mexico. Oaxaca: Dtto. Tehuantepec, Rancho Ricardo, al N de Buenos Aires, entrando por Hierba Santa, 12 Sep 1985, *Torres C. 7306* (holotype: MICH! isotypes: F! MEXU!). Fig. 2.

Frutex vel arbor parva. Laminae 3.5–6 cm longae, 1.5–3.5 cm latae, ellipticae vel ovatae vel lanceolatae, adaxialiter glabrae, abaxialiter papillosae vel parum papillosae, coriaceae, margine integra, glandibus 0.4–0.7 mm diametro, sessilibus; petioli 0.8–1.5 cm longi; stipulae 1.5–2.5 mm longae. Inflorescentia racemosa. Petala decidua; petala lateralia ungue (1.5–) 2–2.5 mm longo, 0.5 mm lato, limbo (5–) 6.5–8 mm longo, (3.8–) 4–4.5 mm lato, elliptico vel anguste ovato; petalum posticum ungue (3–) 4–5 mm longo, (1–) 1.2–1.5 mm lato, limbo (4.5–) 5–6.5 mm longo, (4–) 5.5–6 mm lato, triangulari. Antherae (2.5–) 2.8–3.5 mm longae. Ovarium suturis pubescens; styli subaequales, (4.7–) 5–5.3 mm longi. Coccus ca. 3.5 mm longus, suturis pubescens.

Shrub or treelet to 6 m; stems sparsely pubescent, soon glabrous. Vesture of all vegetative parts of sessile, straight to wavy, reddish brown hairs 0.3–0.8 mm long. Laminas of the larger leaves 3.5–6 cm long, 1.5–3.5 cm wide, elliptical or ovate to lanceolate, apex apiculate or sometimes acute, base acute, adaxially glabrous, abaxially papillose or sometimes only slightly so (the epidermis at least blistered), coriaceous, costa and secondary veins (at least the first two pairs) prominent abaxially (usually appearing white in dry material), the tertiary veins slightly or not at all evident; margin entire; petioles 0.8–1.5 cm long, glabrous or with a few scattered

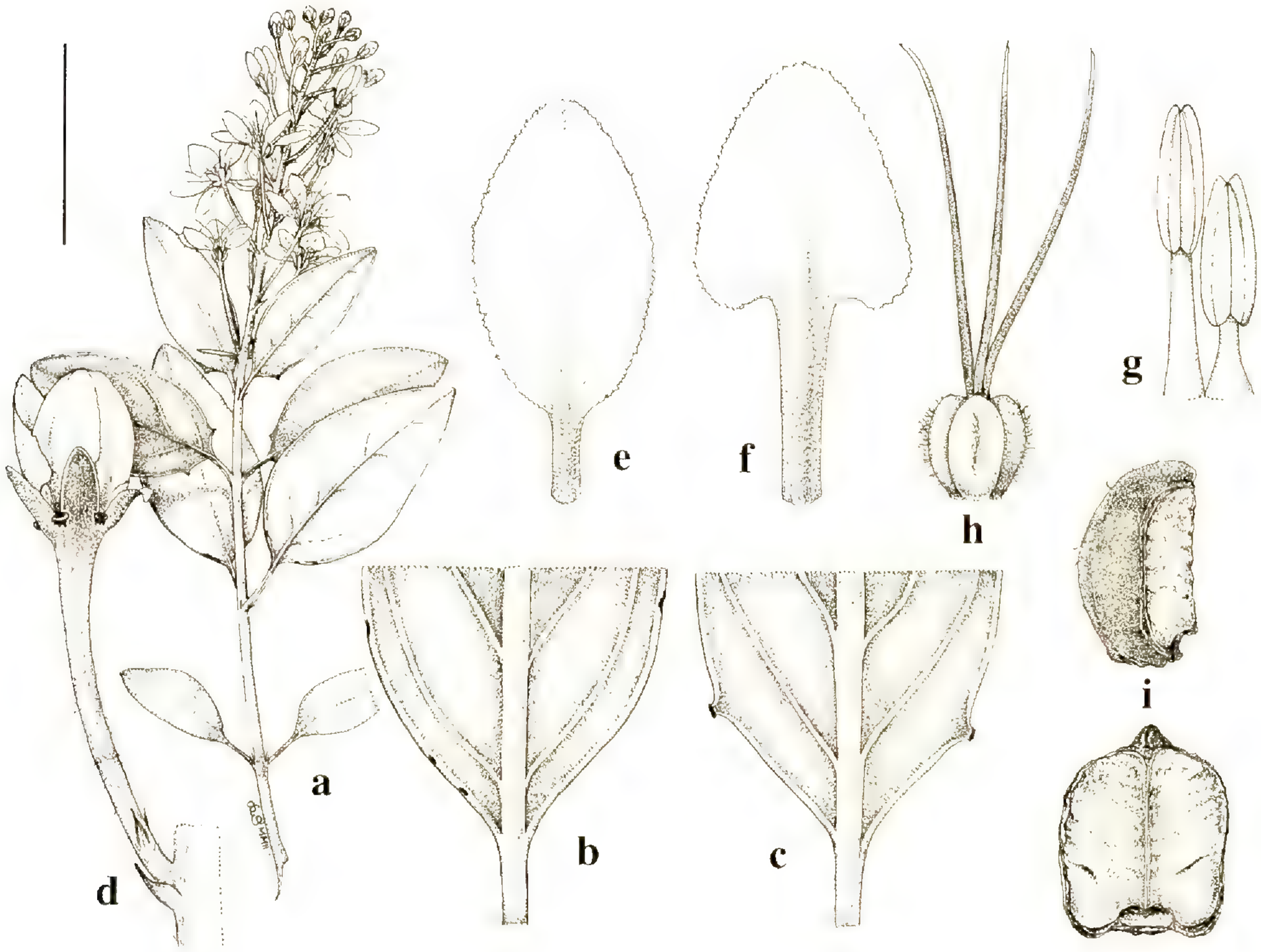


FIG. 2. *Galphimia oaxacana*. a. Flowering branch. b, c. Proximal portion of two leaves, abaxial view. d. Flower borne on pedicel and peduncle, with portion of inflorescence axis; note calyx glands. e. Lateral petal. f. Posterior petal. g. Adaxial view of stamen opposing posterior petal (at right) and posterior-lateral sepal (at left). h. Gynoecium. i. Two cocci, shown in adaxial and lateral view. Scale bar = a, 4 cm; b–d, 8 mm; e, f, 5 mm; g, 4 mm; h, 2.7 mm; i, 3.3 mm. (Based on: a, b, g, i, *Martínez R. 55*; c–f, h, *Torres C. 122*.)

hairs; leaf glands usually a pair borne on the margin of the lamina 8–15 mm above the base or sometimes with 3–6 glands, each gland 0.4–0.7 mm in diameter, disklike and sessile or raised ca. 0.2 mm above the epidermis, or sometimes embedded in the margin; stipules 1.5–2.5 mm long, 0.8–1 mm wide, narrowly triangular, abaxially glabrous. Inflorescence a terminal raceme, the axes sparsely tomentulose or strigose; peduncles 3.5–6.5 mm long, pedicels (7–) 10–15 mm long, both sparsely tomentulose, often more densely at the articulation, in the pedicel the hairs often concentrated in a line extending from the articulation to the calyx, peduncles 0.3–0.5 times as long as pedicels; bracts (1.5–) 2–2.8 mm long, 0.5–0.9 mm wide, linear, bracteoles 0.8–1.7 mm long, 0.3–0.6 mm wide, linear, bracts and bracteoles glabrous; bracteoles borne in the proximal 1/5–1/2 of the peduncle, subopposite. [Sometimes shrubs with only the terminal branches bearing a flush of small leaves along short internodes (to ca. 1 cm long) and a short inflorescence, the leaves 1–2.5 cm long, 0.5–0.9 cm wide; see discussion.] Sepals 2.5–3 mm long, 1.3–1.5 mm wide, oblong, glabrous, occasionally the margin distally fringed with hairs to 0.2 mm long, the calyx with 1–3 (–4) glands, each borne in the sinus at the base of two sepals, glands 0.3–0.5 mm in diameter, prominent and raised to 0.2 mm above the epidermis. Petals deciduous, unequal, yellow, the claws suffused with red; lateral petals: claw (1.5–) 2–2.5 mm long, 0.5 mm wide, limb (5–) 6.5–8 mm long, (3.8–) 4–4.5 mm wide, narrowly ovate to elliptical; posterior petal: claw (3–) 4–5 mm long, (1–) 1.2–1.5 mm wide, limb (4.5–) 5–6.5 mm long, (4–) 5.5–6 mm wide, triangular, apex broadly obtuse. Stamens with heteromorphic

filaments but subequal anthers; filament opposite anterior sepal 4–4.5 mm long, filaments opposite anterior-lateral petals 2.5–3 mm long, filaments opposite anterior-lateral sepals 3.6–4.2 mm long, filaments opposite posterior-lateral petals 1.5–2 mm long, filaments opposite posterior-lateral sepals 3.3–3.5 mm long, filament opposite posterior petal 1.5–2 mm long; anthers (2.5–) 2.8–3.5 mm long, tapered toward the apex. Ovary pubescent along the dorsal sutures, otherwise glabrous; styles subequal, (4.7–) 5–5.3 mm long. Coccus ca. 3.5 mm long, ca. 2.7 mm in diameter, dorsal crest to 0.5 mm wide and pubescent on the suture, otherwise glabrous; areole ca. 3 mm long, ca. 2.5 mm wide; mature seed not seen.

Phenology. Collected in flower from August to October, in fruit from September to December.

Distribution. Mexico (Oaxaca); in deciduous forest ("selva baja caducifolia") and transition to pine-oak forest; 500–1100 m.

Additional Specimens Examined. **Mexico.** Oaxaca: alrededores del Cerro Guiengola, a 10 km aprox. al NW de Tehuantepec, *Cabrera 7413* (MEXU, MO); Dtto. Santo Domingo Tehuantepec, Mpio. Mixtequilla, a 18 km de Mixtequilla, carretera a Paso Escondido, 16°27'N, 95°19'W, *Calzada 19255* (MEXU); Mpio. Santiago Laollaga, recorrido por el aguaje Coyol, al W de Laollaga, 16°34'N, 95°14'W, *Campos V. 4039* (F, MEXU, MO); Mpio. Santiago Laollaga, recorrido hacia y por el Arroyo de Hierba Santa, al E de Guichixu, brecha Laollaga–Guevea de Humboldt, 16°41'N, 95°16'W, *Campos V. 4129* (F, MEXU, MO); Dtto. Tehuantepec, Mpio. Buenos Aires, Buenos Aires, rumbo a El Cerro Arenal, *Martínez R. 55* (IEB, MICH); Dtto. Tehuantepec, ruinas del Cerro Guiengola, *Torres C. 40* (MEXU, MO); Dtto. Tehuantepec, "Las Palmitas," ladera oriente del Cerro Guiengola, *Torres C. 122* (IEB, MEXU, MO); Dtto. Tehuantepec,11 km al W de la Chiviza, hacia Lachiguiri, *Torres C. 5717* (MEXU, MICH, XAL); Dtto. Tehuantepec, 12.2 km al W de la Chiviza, hacia Lachiguiri, *Torres C. 5720* (F, MEXU); Dtto. Tehuantepec, 11.3 km al N de La Chiviza, *Torres C. & Martínez 5880* (MEXU, MICH).

*Galphimia oaxacana*, known only from the Pacific slope of the Isthmus of Tehuantepec, is distinctive in its leaves and flowers. The abaxial surface of the thick laminas is commonly papillose, and the costa and secondary veins are prominent. Calyx glands are present in all or nearly all flowers of an inflorescence, and the ovaries and cocci are beset with fine hairs along the dorsal sutures.

The collections *Torres C. 122, Torres C. 5717,* and *Torres C. & Martínez 5880* differ in that they consist of terminal branches bearing a flush of small leaves along short internodes (to ca. 1 cm long) and a short inflorescence; the leaves are 1–2.5 cm long, 0.5–0.9 cm wide. This growth form may reflect particularly dry conditions.

## KEY TO THE MEXICAN SPECIES OF GALPHIMIA WITH DECIDUOUS PETALS

1. Peduncles absent, the pedicels subtended by a bract and a pair of bracteoles.
   2. Leaves essentially glabrous or with a few scattered hairs, especially on the midrib abaxially; Baja California, Baja California Sur, Chihuahua, Coahuila, Durango, Nuevo León, San Luis Potosí, Sinaloa, Sonora, Tamaulipas. *G. angustifolia* Benth. [synonym: *G. linifolia* A. Gray].
   2. Leaves densely white-pubescent; Nayarit, Sinaloa, Sonora. *G. vestita* S. Watson
1. Peduncles present, subtended by a bract and bearing a pair of bracteoles, the articulation commonly marked with a band of hairs.
   3. Ovaries and fruits densely and evenly pubescent.
      4. Inflorescence entirely glabrous (except for pubescent ovary); calyx glands present; petals mostly red with yellow markings; leaf glands borne on the petiole, commonly in the proximal 1/6–1/2 (rarely distally); Guerrero, Jalisco, México, Michoacán, Sinaloa. *G. glandulosa* Cav. [synonyms: *Thryallis palmeri* Rose, *T. dasycarpa* Small]
      4. Inflorescence sparsely or abundantly pubescent; calyx glands absent or present; petals yellow, usually with red markings; leaf glands borne on the margin of the lamina.

5. Petioles beset with hairs borne on persistent tubercles and/or only with the tubercles (the hairs already shed); branchlets commonly roughened by the persistent tubercles; Colima, Jalisco, Nayarit, Sinaloa.
*G. tuberculata* (Rose) Nied. [synonym: *G. humilis* (Rose) Nied.]

5. Petioles smooth, glabrous or with sessile or subsessile hairs; branchlets smooth or the bark lightly fissured.
6. Anthers 3–4 mm long, narrowly triangular in outline (the base ca. twice as wide as the apex); filament of stamen opposing the anterior sepal 3.5–4 mm long, filament of stamen opposing the posterior petal shorter than that of stamens opposing the posterior-lateral sepals (1.6–2.6 mm vs. 3.5–4.6 mm); peduncles 0.6–1.2 (–1.6) times as long as pedicels; Colima, Guerrero, Jalisco, Michoacán.
*G. langlassei* (Blake) C. Anderson

6. Anthers 2.3–2.5 (–2.8) mm long, oblong or elliptical in outline (equally wide at base and apex); filament of stamen opposing the anterior sepal 2.2–2.6 mm long, filament of stamen opposing the posterior petal and those of stamens opposing the posterior-lateral sepals subequal [1.5–1.7 (–2) mm vs. 1.5–1.8 (–2.2) mm]; peduncles 0.3–0.5 (–0.7) times as long as pedicels; southern Nayarit and adjacent Jalisco.
*G. mexiae* C. Anderson

3. Ovaries and fruits glabrous, or with hairs concentrated on the sutures.
7. Petioles beset with hairs borne on persistent tubercles and/or only the tubercles (the hairs already shed); branchlets commonly roughened by the persistent tubercles (in *G. gracilis* not or only slightly so).
8. Laminas abundantly pubescent above and below with hairs borne on tubercles, the hairs eventually sloughed off and the laminar surfaces retaining the persistent tubercles; Guerrero.
*G. hirsuta* Cav.

8. Laminas glabrous or glabrate, often with some scattered hairs on the midrib below, the laminar surfaces smooth.
9. Margin of lamina entire, leaf glands prominent or flush with the margin; bracteoles borne at or just below the apex of the peduncle; pedicels 5–10 mm long, peduncles 0.5–1 times as long as the pedicels; Tamaulipas and Veracruz, and adjacent regions of Hidalgo, Puebla, Querétaro, and San Luis Potosí.
*G. gracilis* Bartling

9. Margin of lamina beset with scattered tubercles and/or somewhat longer epidermal processes, leaf glands prominent to stalked; bracteoles borne on the peduncle in the proximal 1/4 to 1/2; pedicels 2–5 mm long, peduncles 1.2–3 times as long as the pedicels; coastal Oaxaca.
*G. arenicola* C. Anderson

7. Petioles smooth, glabrous or with sessile or subsessile hairs; branchlets smooth or the bark lightly fissured.
10. Leaves subsessile, the petioles rudimentary; leaf glands mostly absent; Oaxaca.
*G. sessilifolia* Rose

10. Leaves petiolate; leaf glands usually present.
11. Petals subequal; hairs on ovaries/fruits to 0.5 mm long; petioles 1.5–2.3 cm long, laminas 7–12 cm long; Guerrero.
*G. radialis* C. Anderson

11. Petals unequal, limb of lateral petals narrower than limb of posterior petal; hairs on ovaries/fruits to 0.1 mm long or ovaries/fruits glabrous; petioles 0.4–1.5 cm long, laminas 2–6 cm long.
12. Calyx glands present in all (or almost all) flowers of an inflorescence; laminas abaxially commonly papillose (or the epidermis at least blistered), coriaceous, the secondary veins prominent abaxially; ovaries/fruits with hairs on the sutures; Pacific slope of Oaxaca.
*G. oaxacana* C. Anderson

12. Calyx glands absent, or one or a few flowers of an inflorescence with 1 or 2 calyx glands (rarely many flowers with calyx glands); laminas abaxially smooth, succulent or chartaceous, the secondary veins not prominent; ovaries/fruits glabrous or with hairs on the sutures.
13. Laminas succulent, elliptical to broadly ovate to suborbicular, the base often decurrent, glands 0.6–1 mm in diameter, sessile on the margin; pedicels 14.5–18.5 mm long; Guerrero, Puebla.
*G. mirandae* C. Anderson

13. Laminas chartaceous, ovate or elliptical or narrowly elliptical, the base acute, glands 0.4–0.6 mm in diameter, raised above the margin or borne on the petiole; pedicels 5.5–10.5 mm long.

14. Bracteoles borne at or just below the apex of the peduncle (i.e., just below the articulation); laminas elliptical or narrowly so, with an apical tuft of hairs (best seen in younger leaves); peduncles 0.5–1 times as long as pedicels; anterior styles longer than the posterior style; ovary glabrous; calyx eglandular; Tamaulipas and Veracruz, and adjacent regions of Hidalgo, Puebla, Querétaro, and San Luis Potosí. *G. gracilis* Bartling
14. Bracteoles borne near the middle of the peduncle, or one near the middle and the other near the base; laminas ovate or lanceolate, without an apical tuft of hair; peduncles 0.2–0.6 times as long as the pedicels; styles subequal; ovary glabrous or with hairs on the sutures; calyx glands present or absent; Guerrero, Jalisco, Michoacán, Nayarit, Sinaloa, and southwestern Durango and Zacatecas. *G. montana* (Rose) Nied.

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I thank William R. Anderson and Gordon McPherson for their advice and comments on the manuscript, and Karin Douthit for the handsome drawings. I am grateful to the curators of the following herbaria for making their collections of *Galphimia* available to me: DS, ENCB, F, IEB, MEXU, MBM, MICH, MO, TEX, XAL.

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Contr. Univ. Michigan Herb. 24: 21–23. 2005.

# PTERANDRA VIRIDIFLORA (MALPIGHIACEAE), A NEW SPECIES FROM BRAZIL

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ABSTRACT. *Pterandra viridiflora*, a new species from Brazil, is described and illustrated. The novelty is distinguished by its green petals and the placement of inflorescences in the axils of well-developed leaves.

*Pterandra* Adr. Juss. is a genus of trees and shrubs of Central and South America (Fig. 1), which is named for its winged anthers (Fig. 2e). It is readily recognized by its stipules and inflorescences. The intra- and epipetiolar stipules are entirely to partly connate, forming two broadly triangular structures that act as valvate bud scales. The inflorescences consist of 2–6-flowered fascicles borne in the axils of bracts or leaves that are crowded at branch apices. The peduncles are absent, and each pedicel is subtended by a bract and two bracteoles. The petals are abaxially pubescent and persistent in fruit. In my monograph of *Pterandra* (Anderson 1997), I recognized 14 species; to these I add the novelty here described.

**Pterandra viridiflora** C. Anderson, sp. nov.—TYPE: BRAZIL. Minas Gerais: Berilo, UHE–Irapé, *E. Tameirão Neto 3204* (holotype: MICH!). Fig. 2.

Frutex. Laminae 6–8.5 cm longae, 2.5–4.1 cm latae, obovatae vel ellipticae, supra glabrae praeter costam dense sericeam, subtus tomentulosae; petioli 0.4–1 cm longi, dense aureo-sericei; stipulae (2.5–) 3–4 mm longae lataeque, connatae, adaxialiter hirsutae, abaxialiter aureo-sericeae. Inflorescentia ex fasciculis sessilibus et axillaribus constans, floribus cujusque fasciculi 2–4; pedicelli 2.1–2.7 cm longi, 0.5–0.6 mm diametro, dense aureo-sericei. Petala pallide viridia, limbo late elliptico vel late obovato vel suborbiculari; limbi petalorum lateralium 5–5.5 mm longi, 3–3.3 mm lati, obovati, limbus petali postici ca. 5.5 mm longus, ca. 4 mm latus, suborbicularis. Filamenta praeter caespitem basalem glabra. Styli ca. 4.5 mm longi. Cocci ca. 3.5 mm alti diametroque, hirsutulo-tomentosi.

Shrub; young branchlets densely golden-sericeous, older ones glabrous. Laminas 6–8.5 cm long, 2.5–4.1 cm wide, obovate to elliptical, apex obtuse-mucronate or sometimes emarginate, base cuneate, adaxially tomentulose when young but glabrate to glabrous at maturity except for the pubescent costa, abaxially sericeous or sparsely so but densely so on the costa, the vesture composed of hairs 0.2–0.7 mm long, medifixed, terete, straight, more or less appressed, mostly white or sometimes golden, and with scattered longer and thicker hairs, ca. 0.8–1.2 mm long, subsessile or with a stalk up to 0.05 mm long, translucent dots present on abaxial surface, costa and secondary veins prominent abaxially, tertiary veins usually slightly raised as well; petioles 0.4–1 cm long, densely golden-sericeous; stipules (2.5–) 3–4 mm long and wide, connate, adaxially hirsute, abaxially sericeous. Inflorescence of sessile, 2–4-flowered fascicles, each fascicle borne in the axil of a leaf; pedicels 2.1–2.7 cm long, 0.5–0.6 mm in diameter, densely golden-sericeous; bracts 2–2.2 mm long, 0.8–1 mm wide,

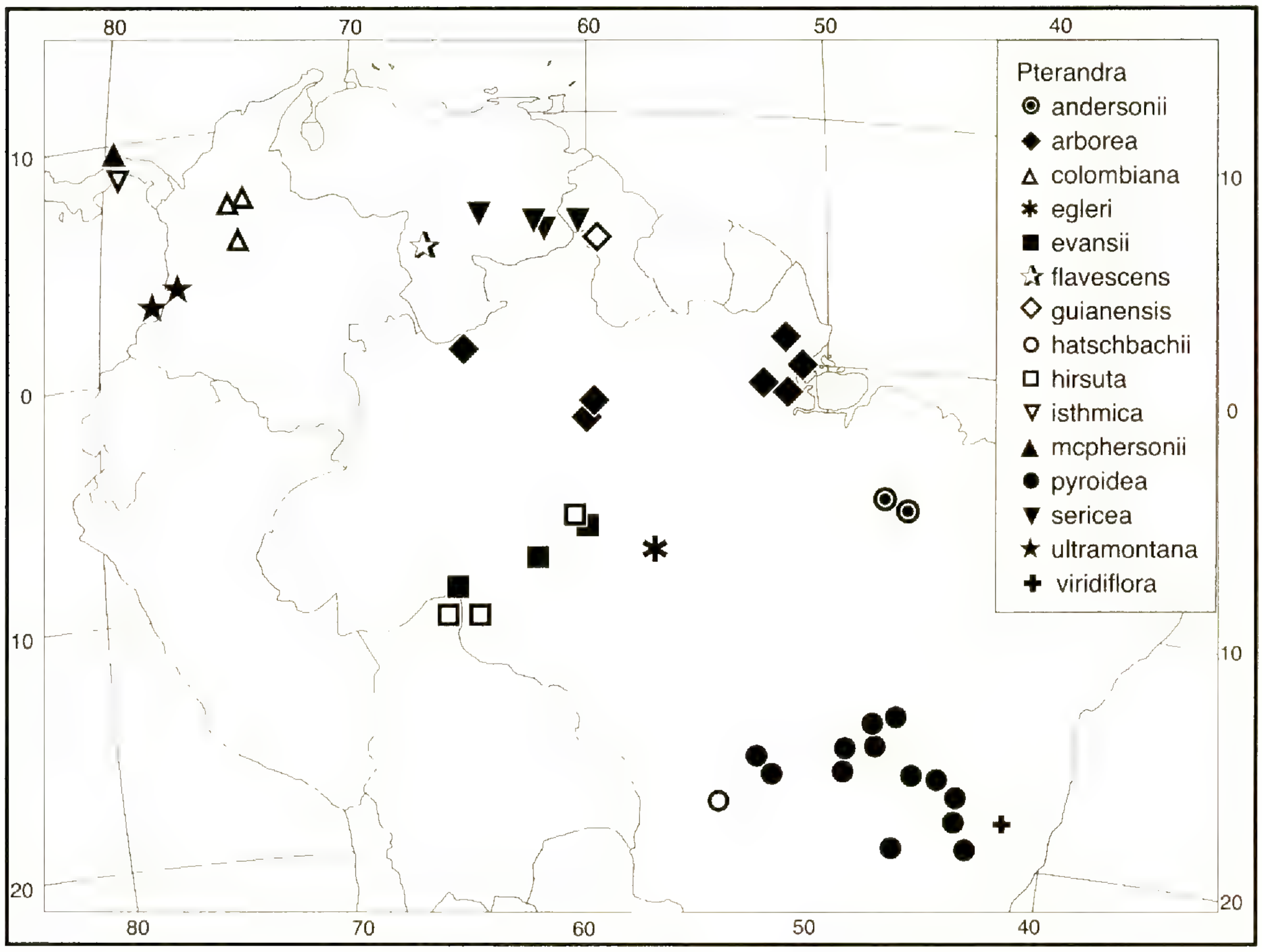


FIG. 1. Distribution of *Pterandra*.

triangular, bracteoles 1–1.2 mm long, ca. 0.3 mm wide, linear, bracts and bracteoles with the apex acute, abaxially densely golden-sericeous. Sepals ca. 2.5 mm long, ca. 2 mm wide, triangular (the distal 2/3 ligulate), recurved, glands ca. 2 mm long, ca. 0.8 mm wide. Petals light green, margin erose, abaxially densely pubescent on claw and center of limb; lateral petals: claw 1.5–1.7 mm long, limb 5–5.5 mm long, 3–3.3 mm wide, the limb obovate; posterior petal: claw ca. 2 mm long, limb ca. 5.5 mm long, ca. 4 mm wide, the limb suborbicular. Filaments glabrous except for a basal tuft of hairs, those of stamens opposing sepals ca. 2.5 mm long, those of stamens opposing petals ca. 3 mm long; anthers ca. 1 mm long, wing of outer locules 0.2 mm wide. Styles ca. 4.5 mm long, ca. 0.3 mm in diameter, with scattered hairs adaxially in the proximal 1/4. Cocci ca. 3.5 mm high and in diameter, hirsutulose-tomentulose; torus ca. 1 mm high; mature seed not seen.

*Pterandra viridiflora* is known only from the type. It is distinctive in its green petals and the placement of the inflorescences. In most species, the fascicles are borne on a leafless node of a short shoot, often below a flush of new leaves, and subtended by a bract composed of the stipules and a rudimentary leaf; in *P. flavescens* and *P. sericea* (occasionally) the fascicles are placed in the axil of a new leaf. In *P. viridiflora* the fascicles are borne in the axils of well-developed leaves of a young shoot.

Because most species of *Pterandra* are known from few collections, their ranges are not well known (Fig. 1). An exception is the showy *P. pyroidea*, which is common in Minas Gerais, the Distrito Federal, and southern Goiás. The very similar *P. hatschbachii* was found to the west in Mato Grosso. Both species are low shrublets and have large pink petals. *Pterandra viridiflora* was collected in eastern Minas Gerais, but in all aspects resembles more the northern species, which are larger shrubs to trees and

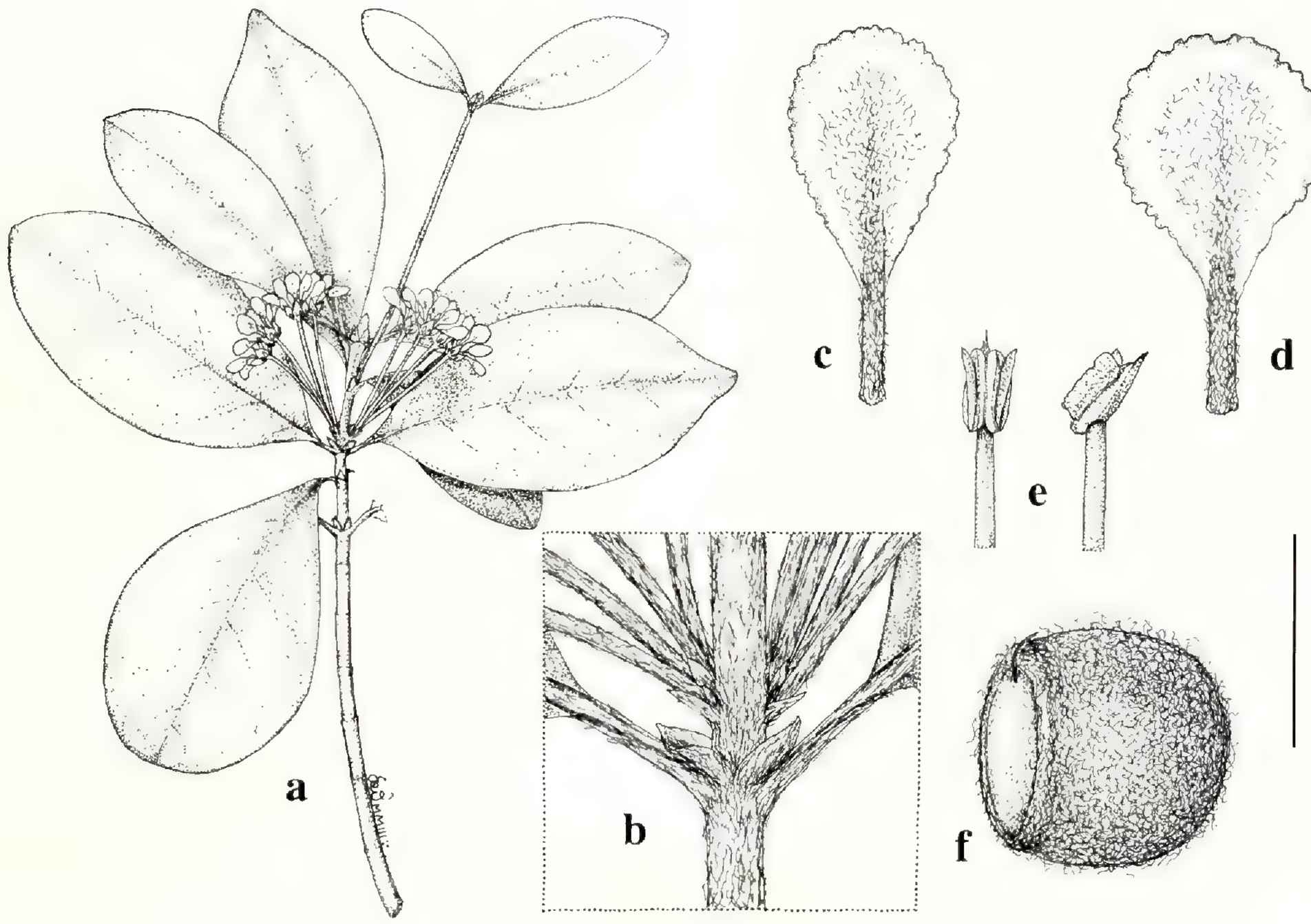


FIG. 2. *Pterandra viridiflora*. a. Flowering branch. b. Detail showing insertion of fascicles in the axils of mature leaves; note the heart-shaped intra- and epipetiolar stipules. c. Lateral petal, abaxial view. d. Posterior petal ("flag"), abaxial view. e. Stamens, adaxial and side views. f. Coccus. Scale bar = a, 4 cm; b, 8 mm; c, d, 4 mm; e, 2 mm; f, 2.7 mm. (Based on *Tameirão Neto 3204*.)

have smaller petals, white to cream (yellow in age). Green petals are otherwise unknown in the genus, although *P. guianensis*, known only from the type, was reported on the label to have greenish white petals. The label data for *P. viridiflora* did not include notes on stature, only that it is shrub.

## ACKNOWLEDGMENTS

William R. Anderson and Gordon McPherson provided helpful comments, and Karin Douthit drew the beautiful illustration. I thank the curators at BHCB for sending to MICH as a gift the type specimen of *Pterandra viridiflora*.

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# HETEROPTERYS OXENDERI, A NEW NAME FOR MASCAGNIA DISCOLOR (MALPIGHIACEAE)

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ABSTRACT. The name *Heteropterys oxenderi* W. R. Anderson is proposed for the species *Mascagnia discolor* W. R. Anderson when it is transferred to the genus *Heteropterys*, in which the epithet *discolor* is preoccupied. *Heteropterys oxenderi*, known only from La Paz province, Bolivia, is related to *H. sylvatica* Adr. Juss. and *H. mollis* (Nied.) Nied. in Engl., species of southern Bolivia and adjacent Brazil and Argentina.

In 1995 I described a flowering specimen from Bolivia as *Mascagnia discolor* W. R. Anderson. At that time I was confident of its generic placement, even without the diagnostic fruits, but I was mistaken. A subsequently received collection of the species with fruits showed it to belong to the genus *Heteropterys*, and the epithet *discolor* has already been used in *Heteropterys*, so it is necessary to propose a new name for *M. discolor* in *Heteropterys*. The description given below is modified from that in the protologue to include data from the second collection.

**Heteropterys oxenderi** W. R. Anderson, nom. nov. *Mascagnia discolor* W. R. Anderson, Contr. Univ. Michigan Herb. 20: 33. 1995, non *Heteropterys discolor* Adr. Juss. in A. St.-Hil.—TYPE: BOLIVIA. La Paz: Inquisivi Province, 19 km N of Choquetanga, 16°41'S, 67°20'W, 1800 m, matorral, 27 Nov 1991 fl, *Lewis 40696* (holotype: MICH!; isotypes: MO! NY!). Fig. 1.

Shrub 2–3 m tall with leaning branches, the stems tomentose with strongly twisted reddish brown hairs, eventually glabrescent. Leaves opposite or subopposite; lamina of larger leaves 7–10.7 cm long, 4.7–8 cm wide, ovate or broadly elliptical, broadly cuneate or truncate at base, abruptly short-acuminate to rounded at apex, bearing a series of bulging marginal glands on the distal third ± hidden by the vesture, tomentose to eventually glabrescent above with the epidermis visible between the brown (eventually whitish), stalked, strongly twisted hairs, persistently tomentose below, the hairs mostly pale yellow to near-white except brown along veins, very fine, with a sinuous or twisted crosspiece 1–2.2 mm long raised on a stalk 0.5–1 mm long, the hairs in aggregate producing a dense woolliness that nearly or completely hides the epidermis; petiole 9–22 mm long, densely and persistently brown-tomentose, bearing (0–1–) 2 bulging glands 1–2 mm in diameter at apex or up to 5 mm below apex; stipules not found. Inflorescence an axillary pseudoraceme, unbranched, 7–13 cm long, reddish-brown-tomentose to eventually glabrescent, the 15–40 flowers borne ascending to nearly horizontal and evenly distributed, not congested except for very immature buds at apex; bracts 1.5–2.5 mm long, subulate or narrowly triangular, deciduous during anthesis; peduncle (2–) 3–8 mm long, tomentose to glabrescent in fruit; bracteoles 1–1.7 mm long, triangular, ovate, or elliptical, persistent, borne at or somewhat below apex of peduncle, one eglandular and the other bearing 1 large eccentric abaxial gland; pedicel 1.5–3 mm long, tomentose to glabrescent in fruit. Lateral 4 sepals bearing 8 glands 2.5–3 mm long, the sepals 1.5–2 mm long beyond

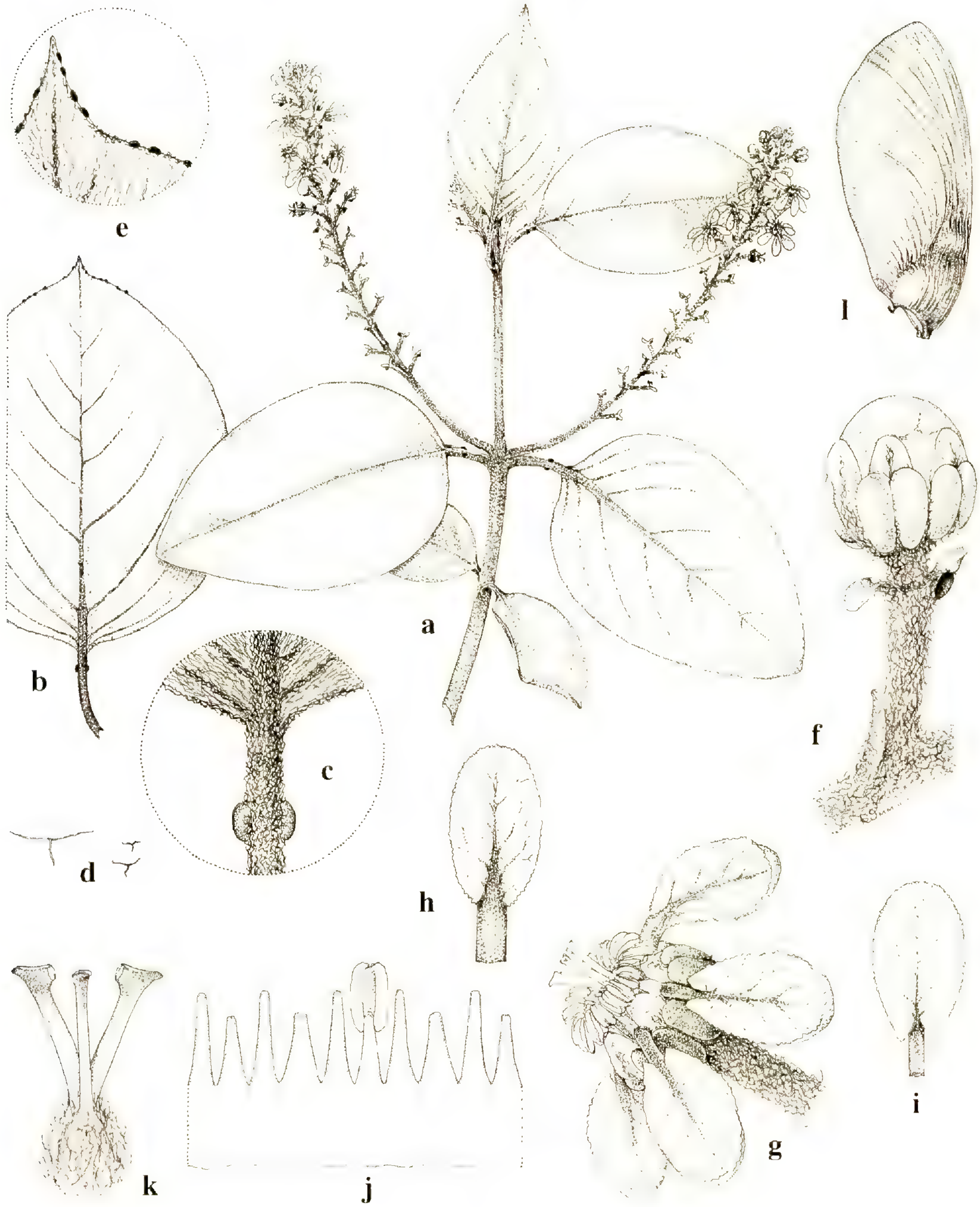


FIG. 1. *Heteropterys oxenderi*. a. Flowering branch, ×0.5. b. Large leaf, abaxial view, ×0.5. c. Base of lamina, abaxial view, and distal half of petiole, ×2.5. d. Hairs from abaxial surface of lamina, white hair from between veins (left) and brown hairs from veins (right), ×5. e. Apex of lamina to show marginal glands, ×2.5. f. Flower bud, ×5. g. Flower, side view, ×4. h. Posterior petal, adaxial view, ×4. i. Lateral petal, adaxial view, ×4. j. Androecium laid out, abaxial view, all anthers removed except from stamen opposite posterior petal, ×7.5. k. Gynoecium, anterior style in center, ×10. l. Samara, ×1. (Based on: a, f–k, *Lewis 40696*, MICH; b–e, l, *Salinas 3051*, MICH.)

the glands; anterior sepal eglandular but partially covered by the 2 adjacent glands; all sepals ovate or elliptical with minutely denticulate margin and rounded apex, abaxially loosely sericeous in center and glabrous toward margin, adaxially glabrous, appressed in anthesis. Petals "yellow-orange," glabrous, exposed in enlarging bud, abaxially smooth, the lateral 4 strongly reflexed in the claw, with the limb 4.5–5 mm

long, 3–3.2 mm wide, obovate or elliptical, minutely denticulate, truncate or slightly hastate at the base, the claw 1.3–1.5 mm long; posterior petal hardly different, but with the claw thicker and spreading, not reflexed, and the limb spreading to reflexed. Filaments 2.5–3 mm long, slightly longer opposite sepals than petals, glabrous, connate in the basal half; anthers 1.3–1.6 mm long, glabrous, reflexed in anthesis. Ovary ca 2 mm high, densely hirsute; styles 1.5–1.8 mm long, divergent distally, with a short dorsal hook (0.1–0.2 mm long) at the apex. Samara 35–40 mm long; nut 10–13 mm long, 8–10 mm high, without any sort of winglets or other outgrowths on sides, brown-tomentose to glabrescent; dorsal wing 25–37 mm long, 13–18 mm wide, ± persistently brown-tomentose or whitish-subsericeous; ventral areole 6–7 mm high, ca 3 mm wide, ovate.

Additional Collection Examined. **Bolivia**. La Paz: Inquisivi Province, comunidad Khora-Lakachaca, cuenca del Río Miguillas, 20 km de Choquetanga, 16°40'S, 67°20'W, 1450 m, bosque, May fr, *Salinas 3051* (MICH).

*Heteropterys oxenderi* is a member of a group of three species, the other two being *H. sylvatica* Adr. Juss. and *H. mollis* (Nied.) Nied. in Engl. The *H. sylvatica* group is defined by stipules epipetiolar if present; petioles usually biglandular between middle and apex; lamina glands marginal if present; inflorescence an unbranched axillary pseudoraceme; bracts long, narrow, and deciduous in anthesis; peduncle longer than pedicel; bracteoles apical or subapical, one or both usually bearing 1–2 large abaxial glands; sepals appressed in anthesis; and petals yellow. *Heteropterys oxenderi*, known only from La Paz province of Bolivia, differs from the other two species in these ways: the lamina, even in age, is abaxially so densely woolly that the long-stalked hairs completely hide the epidermis; the abaxial hairs are brown on the midrib and lateral veins and stramineous or white between the veins; the distal third of the lamina bears large bulging marginal glands ± hidden by the vesture; the pseudoracemes are stout and 7–13 cm long; and the two posterior calyx glands are hardly or not at all more decurrent than the other six. In contrast, *H. mollis* and *H. sylvatica* are known from Santa Cruz, Bolivia (both), Mato Grosso do Sul, Brazil (*H. sylvatica*), Jujuy, Argentina (both), and Salta, Argentina (*H. sylvatica*). Their abaxial lamina hairs are all white and short-stalked, and even at their densest they never completely hide the epidermis of older leaves; the lamina margin is usually eglandular, but may bear few to many small discoid glands; the slender pseudoracemes are 2–7 (–10) cm long; and the two posterior calyx glands are notably more decurrent onto the pedicel than the other six. The only reliable distinction between *H. sylvatica* and *H. mollis* is that in the former the lamina is abaxially glabrate at maturity, while in the latter the lamina is persistently tomentose below.

The epithet of *Heteropterys oxenderi* honors my friend and former student Benjamin J. Oxender (b. 1977), in appreciation of his assistance to me during his years in the University of Michigan Herbarium.

## ACKNOWLEDGMENTS

Karin Douthit prepared the lovely drawing of *Heteropterys oxenderi* with her usual skill. The fruiting specimen that showed the correct generic placement of this species came from the Herbario Nacional de Bolivia (LPB).

Contr. Univ. Michigan Herb. 24: 29–32. 2005.

# TETRAPTERYS ANOMALA, A NEW SPECIES OF MALPIGHIACEAE FROM GUYANA

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ABSTRACT. The new species *Tetrapterys anomala* W. R. Anderson is described, illustrated, and discussed. Among the known species of *Tetrapterys* subgenus *Tetrapterys* it is unique in its coherent styles, and nearly unique in combining minute, distinct, interpetiolar stipules with glands on the abaxial surface of the lamina. The presence of miniature leaves in the inflorescence and outgrowths between the dorsal and lateral wings of the samara suggests that its closest relatives may be *T. discolor* (G. Mey.) DC. and allies in section *Tetrapterys*.

Niedenzu (1928) placed the species of *Tetrapterys* with umbels (as opposed to pseudoracemes) in his subgenus *Caulolepis* Nied., which we would today call subgenus *Tetrapterys* because it includes the lectotype of the genus, *T. inaequalis* Cav. All of those species have the stipules interpetiolar, i.e., borne on the stem between and quite distinct from the petioles. Niedenzu's groupings within that subgenus rely heavily on whether the stipules between each pair of petioles are distinct or connate. Another informative character in that subgenus (not emphasized by Niedenzu) is the position of the lamina glands, marginal or borne on the abaxial surface. The plant described here does not have its states of those two characters associated as they are in most species of the subgenus, and its gynoecium is most peculiar. I am proposing for this species the epithet *anomala* to draw attention to its gynoecium and to its association of distinct stipules with glands on the surface of the lamina.

**Tetrapterys anomala** W. R. Anderson, sp. nov.—TYPE: GUYANA. Potaro-Siparuni Region: Mt. Ayanganna, east face, plateau above first escarpment, 1 km N of camp, 1100 m, 05°20'19"N, 59°56'46"W, dense forest on white sand, sandstone, and peat, 13 Jun 2001 fl, *Clarke 9105* (holotype: MICH!). Fig. 1.

Liana caulibus pertinaciter sericeis; lamina foliorum majorum 6.5–9 cm longa, 3.2–4.5 cm lata, abaxialiter tenuiter sed pertinaciter sericea et multis glandulis minutis dispersis inter costam et marginem instructa; petiolus 7–12 mm longus, eglandulosus; stipulae nullae (?) vel minutae, distinctae, interpetiolares; inflorescentia foliis diminutis instructa, floribus in umbellis 4-floris portatis; petala aurantiaca, glabra; stamina ± aequalia; styli 3, aequales, crassi, erecti, cohaerentes sed non connati, stigmatibus non terminalibus; samara 4 alis lateralibus 15–20 mm longis, 5–8 mm latis, ala dorsali 7 mm alta, 3–5 mm lata, nuce inter alam dorsalem et alas laterales aliquot alulis linearibus usque ad 6 mm longis et 1 mm latis instructa.

Liana, the stems densely and persistently sericeous or, when young, velutino-sericeous. Lamina of larger leaves 6.5–9 cm long, 3.2–4.5 cm wide, ovate to nearly elliptical, cuneate to rounded at base, abruptly short-acuminate at apex, originally sericeous above but soon glabrate or persistently loosely sericeous on midrib, persistently sericeous below with the hairs short, straight, strongly appressed and parallel, numerous but not nearly abundant enough to hide epidermis except on midrib,

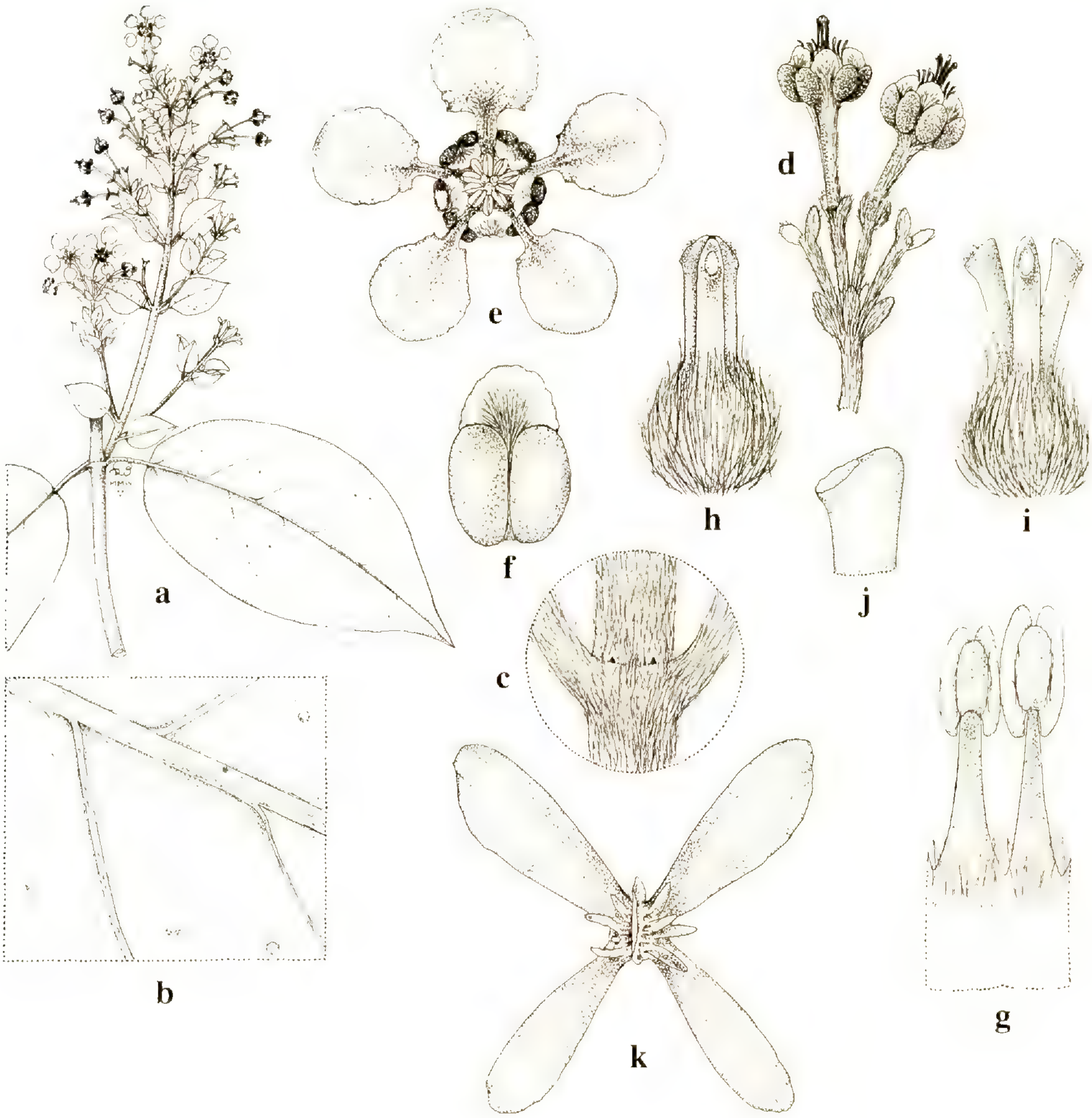


FIG. 1. *Tetrapterys anomala*. a. Flowering branch, ×0.5. b. Abaxial surface of lamina to show minute glands, ×5. c. Node to show minute stipules on interpetiolar ridge, ×5. d. 4-flowered umbel, ×2.5. e. Flower from above, posterior petal uppermost, ×2.5. f. Lateral sepal, abaxial view, ×7.5. g. Two stamens, abaxial view, ×15. h. Gynoecium from young flower with styles coherent, ×10. i. Gynoecium from old flower after styles have separated, ×10. j. Apex of style, ×25. k. Samara, abaxial view, ×1.5. (Based on: a–j, *Clarke 9105*, MICH; k, *Redden 2510*, MICH.)

bearing impressed in abaxial surface between midrib and margin 6–12 tiny glands on each side, ca. 0.3 mm in diameter, irregularly dispersed (i.e., not in a single row) with none at very base, the principal lateral veins 6–9 on each side; petiole 7–12 mm long, densely and ± persistently sericeous, eglandular; stipules absent (?) or distinct triangular nubbins ca. 0.3 mm long, borne on the low interpetiolar ridge, often ± hidden by hairs, persistent (always?). Inflorescence axillary and terminal, densely and persistently golden-velutino-sericeous, a panicle containing much-reduced elliptical or orbicular leaves (non-floriferous bracts) with the lamina 5–15 mm long and 3–12 mm wide, the petiole 2–5 mm long, and persistently densely sericeous on both sides, the flowers borne in 4-flowered umbels; floriferous bracts 1.5–2.2 mm long, 0.8–1.2 mm wide, lanceolate or elliptical, abaxially sericeous, adaxially glabrous, eglandular, persistent; peduncle 2.5–6.5 mm long, persistently loosely sericeous; bracteoles like

bracts but mostly somewhat smaller, borne at apex of peduncle; pedicel 4–7 mm long, originally loosely sericeous but irregularly glabrescent to nearly glabrate in age. Sepals 1.2–1.5 mm long beyond glands, 1.5–2 mm wide, broadly rounded, appressed in anthesis, abaxially sericeous in center and glabrous toward margin, adaxially glabrous, the lateral 4 biglandular with the glands yellow, 2–2.3 mm long, broadly elliptical, symmetrical, sessile, the anterior sepal eglandular or bearing 1 small gland. Petals orange, glabrous, entire or slightly erose; 4 lateral petals spreading, the limb 4 mm long, 4–4.5 mm wide, orbicular or obovate or slightly oblate, the claw 1.5–1.7 mm long; posterior petal suberect, the limb 3.5 mm long, 4.5 mm wide, oblate, the claw 2.5 mm long and thicker than in lateral petals. Filaments ca. 2 mm long, ± alike, straight, connate proximally, abaxially pilose at base, adaxially glabrous; anthers ca. 1 mm long, ± alike, glabrous (?) or sparsely sericeous on sides. Ovary ca. 1.5 mm high, densely hirsute, all 3 locules fertile; styles 3, ca. 1.5 mm long, glabrous, alike, stout, erect, pressed together in anthesis (coherent but not connate) and turned so that their large (but not decurrent) stigmas face outward, obtuse at apex; styles separating in old flowers. Samaras separating from a pyramidal torus 3 mm high and 2.5 mm across; samara loosely sericeous or tomentose on nut, sericeous on wings; 4 lateral wings well developed, 15–20 mm long, 5–8 mm wide, narrowly obovate, subequal or the upper pair slightly larger than the lower pair; dorsal wing 7 mm high, 3–5 mm wide, semicircular or roughly triangular, extending between lateral wings at apex; nut ribbed at right angles to dorsal wing and bearing between dorsal and lateral wings several irregular linear outgrowths up to 6 mm long and 1 mm wide; ventral areole 3–4 mm high, 3 mm wide, ovate.

Additional Specimen Examined. **Guyana**. Cuyuni-Mazaruni Region: Pakaraima Mts., Mazaruni River, NW of Chi-Chi Falls, along stream between two tepuis, ca. 1.5 km above Base Camp 2, 762 m, 05°35'48.6"N, 60°12'48.8"W, very moist, dense forest, Feb fr, *Redden 2510* (MICH).

This species is known only from the two collections cited above. The label with the type said it was a liana; that with *Redden 2510* described it as a "tree to 4 m." Given the fact that most species in this genus are woody vines, I believe this one is more likely to be a liana than a tree.

I can find only one other species of *Tetrapterys* that consistently combines distinct interpetiolar stipules with glands on the surface of the lamina, the condition found in *T. anomala*. That species is *T. mucronata* Cav., which is common and widespread in South America. As I have noted before (Anderson 2001, p. 183), *T. mucronata* is a variable species that may deserve division, but it could not possibly accommodate the plants described here as *T. anomala*. *Tetrapterys mucronata* has the leaves glabrous or soon glabrate, and the stems are usually similar. The inflorescence lacks the miniature leaves found in *T. anomala*, the floriferous bracts are very narrow, and the calyx glands (if present) become stalked in age. The styles are distinct, long and slender, tapered distally, with the small stigma terminal or slightly internal. The upper lateral wings of the samara are much longer than the lower, about twice as long. These characters suggest that *T. anomala* and *T. mucronata* are not even very closely related.

The presence of miniature leaves (non-floriferous bracts) in the inflorescence suggests that the closest relatives of *T. anomala* are probably to be found in section *Tetrapterys* (section *Lophogynixa* Nied.), in which such bracts are common. Perhaps one should look to *T. discolor* (G. Mey.) DC. and allied species, because those plants have well-developed outgrowths between the dorsal and lateral wings of the samara,

as in *T. anomala*, but they all have much larger stipules that are connate in interpetiolar pairs, which are often caducous.

The gynoecium in *T. anomala* is unlike any I have seen before in *Tetrapterys*. In early flower the three styles are coherent but easily separated, forming a columnar structure as if they were standing back-to-back with their stigmas facing outward; the appearance is reminiscent of the gynoecium in some species of *Bunchosia*. The stigma is presumably on the internal angle of the style, which suggests that the styles must be twisted so that the stigmas will face outward, but that twisting is not obvious in the very limited material now available for study. The stout styles and large stigmas are consistent with species of *Tetrapterys* section *Tetrapterys*, but the stigma here is not decurrent, as it is in many species of section *Tetrapterys*.

## ACKNOWLEDGMENTS

The specimens described above came to MICH as a gift from the U.S. National Herbarium. The drawing was prepared by Karin Douthit.

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# THE MASCAGNIA CORDIFOLIA GROUP (MALPIGHIACEAE)

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ABSTRACT. A revision is provided for the *Mascagnia cordifolia* group, five South American species with basally biglandular petioles. The group comprises *M. aptera* W. R. Anderson, *M. cordifolia* (Adr. Juss. in A. St.-Hil.) Griseb. in Mart., and three new species: *M. aequatorialis* W. R. Anderson & C. Cav. Davis, *M. affinis* W. R. Anderson & C. Cav. Davis, and *M. glabrata* W. R. Anderson & C. Cav. Davis. The treatment includes a key, descriptions, specimens studied, notes, a distribution map, and illustrations of *M. aequatorialis*, *M. aptera*, and *M. cordifolia*.

*Mascagnia* (Bertero ex DC.) Colla, as treated by Niedenzu (1928) and other authors, is a diverse assemblage of about 100 species of wing-fruited Malpighiaceae. Anderson (e.g., 1990, p. 51) has suggested repeatedly that the genus in the broad traditional sense is possibly or probably polyphyletic, and recent molecular phylogenies (Cameron et al. 2001; Davis et al. 2001, 2002) have supported his opinion—they show that *Mascagnia* sens. lat. comprises at least six distinct clades. In a separate paper, now in preparation, W. R. Anderson will divide *Mascagnia* sens. lat. into several putatively monophyletic genera.

*Mascagnia* sens. str. is by far the largest clade within *Mascagnia* sens. lat. Most species of *Mascagnia* sens. str. can be recognized by the following combination of character-states (W. R. Anderson, unpublished data): vines with interpetiolar stipules, glands impressed in the abaxial surface of the lamina, glabrous petals exposed in the enlarging bud, orbicular membranous samaras with arching and anastomosing veins in the lateral wing, and a smooth three-lobed disciform structure subtending the fruit. The genus is easily subdivided: about 20 of the approximately 50 species have yellow petals, and the others have petals that are pink, lilac, or white. Among the latter, one group of five species is delineated by an easily observed character—a pair of large glands at the base of the petiole. Those species, which we are calling the *Mascagnia cordifolia* group, are the subject of this paper. Morphologically, the species of the *M. cordifolia* group are typical of *Mascagnia* sens. str., and plastid DNA sequences from *M. cordifolia* (C. C. Davis, unpublished data) nest it among other species of the genus. The group comprises *Mascagnia cordifolia* (Adr. Juss. in A. St.-Hil.) Griseb. in Mart., three species that are essentially sympatric with and morphologically very similar to *M. cordifolia* (*M. affinis* W. R. Anderson & C. Cav. Davis, *M. aptera* W. R. Anderson, and *M. glabrata* W. R. Anderson & C. Cav. Davis), and one species (*M. aequatorialis* W. R. Anderson & C. Cav. Davis) that is morphologically distinct and geographically isolated (Fig. 1). Basally biglandular petioles are otherwise unknown in *Mascagnia*, and are putatively synapomorphic for the *M. cordifolia* group. The five species treated here also have pink petals that are abaxially carinate or alulate and straight styles that are dorsally rounded or truncate at the apex. On the basis of overall morphological similarity it seems very likely that *M. cordifolia*, *M. aptera*, *M. affinis*, and *M. glabrata* are monophyletic. It will be interesting to test whether the monophyly of the whole group will be supported when we get better morphological

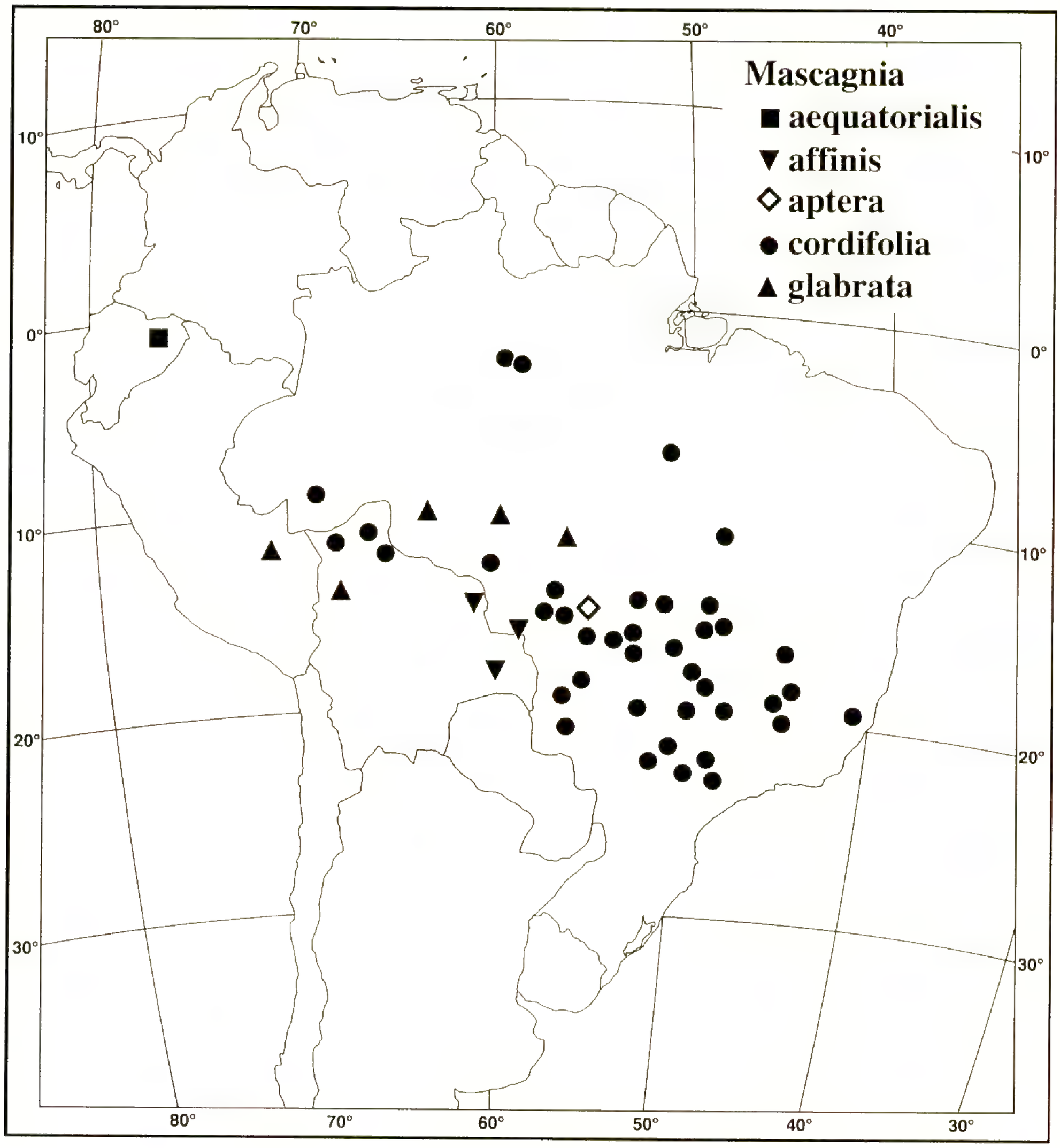


FIG. 1. Distribution of species in the *Mascagnia cordifolia* group.

information about *M. aequatorialis* and representative sequence data for members of the group and for other pink-flowered species of *Mascagnia* sens. str. See under *M. cordifolia* a discussion of *M. strigulosa* (Rusby) Nied. in Engl., a species that resembles *M. cordifolia* in some characters but lacks the petiole glands that we have used to circumscribe the group.

## Key to the Species of the Mascagnia cordifolia Group

1. Lamina densely and persistently silver-metallic-sericeous below; Amazonian Ecuador. *M. aequatorialis*
1. Lamina hairy to glabrate below, velutinous, tomentose, or loosely sericeous if hairy, never metallic-sericeous; Amazonian and southern Brazil and adjacent Peru and Bolivia.
   2. Scandent subshrub; samara reduced to a nut with dorsal crest, the lateral wing completely absent. *M. aptera*

2. Vigorously twining vine, often forming thickets or climbing high in trees; samara with a large membranous lateral wing (as in most species of the genus).
   3. Lamina densely and persistently velutinous below, the hairs V-shaped. *M. cordifolia*
   3. Lamina tomentose or loosely sericeous to glabrate below, the hairs (if present) straight to sinuous or twisted.
      4. Lamina densely and persistently subsericeous to tomentose below, the hairs dense enough to touch each other over the whole surface. *M. affinis*
      4. Lamina thinly sericeous to glabrate below, the hairs dense enough to touch each other only on midrib and lateral veins. *M. glabrata*

**Mascagnia aequatorialis** W. R. Anderson & C. Cav. Davis, sp. nov.—TYPE: ECUADOR. Napo: Estación Biológica Jatun Sacha, Río Napo, 8 km E of Misahuallí, 01°04'S, 77°36'W, 450 m, disturbed wet tropical forest, 22 Oct 1988 imm fl, *Cerón M. & Iguago 5475* (holotype: MICH!; isotype: MO!). Fig. 2.

Liana; lamina foliorum majorum 11–16.5 cm longa, 7.5–14 cm lata, late ovata, abaxialiter dense et pertinaciter argenteosericea; petiolus 15–25 (–30) mm longus, basi biglandulosus; flores in pseudoracemis 25–70-floris portati, pedunculis 10–15 mm longis, pedicellis immaturis 3–5 mm longis; 1 bracteola cujusque paris eglandulosa, altera 1 glandula magna instructa; petala rosea, abaxialiter carinata; styli recti erectique, apice dorsaliter rotundati.

Liana, the stems brown-sericeous with the hairs persistent during first year of growth, the leafy flowering branches borne on old woody stems. Lamina of larger leaves 11–16.5 cm long, 7.5–14 cm wide, broadly ovate, broadly cuneate, rounded, or broadly cordate at base, abruptly short-acuminate at apex, persistently subsericeous above with the hairs sessile and nearly straight but the branches somewhat raised, densely and persistently silver-metallic-sericeous below with sessile, straight, ± appressed hairs, bearing an abaxial row of 4–5 impressed glands on each side between midrib and margin with the most proximal glands remote from base, the principal lateral veins 6–8 on each side; petiole 15–25 (–30) mm long, persistently sericeous, biglandular at base with the glands 1–2 mm in diameter; stipules 1–1.8 mm long, narrowly triangular, sericeous, borne on stem between petioles. Inflorescences axillary, 6–11 cm long, unbranched or branched near middle and then a panicle of 3 (–5) pseudoracemes, each pseudoraceme containing 25–70 or more crowded ascending flowers, the axes (including peduncles and pedicels) brown- or white-sericeous; bracts 1–2 mm long, triangular, abaxially white-sericeous, eglandular or the lowest pair biglandular; peduncle 10–15 mm long; bracteoles 0.8–1.1 mm long, borne 0.5–2 mm below apex of peduncle, abaxially white-sericeous, usually 1 of each pair eglandular and the other bearing 1 prominent discoid eccentric abaxial gland 0.6–1 mm in diameter, but sometimes 1 bracteole bearing 2 glands and rarely both bracteoles bearing glands; pedicel (in bud) 3–5 mm long, much shorter than peduncle. Flowers known only in bud. Sepals 0.5–1 mm long beyond glands, abaxially white-sericeous, all 5 apparently biglandular but glands on the anterior sepal smaller or connate with adjacent glands. Petals pink, glabrous, abaxially carinate with the keel 0.2–0.3 mm wide on lateral petals, narrower on posterior petal. Stamens glabrous; filaments longer opposite sepals than opposite petals; anthers alike, 1.3–1.5 mm long. Ovary densely sericeous; styles alike, straight and erect, dorsally rounded at apex. Fruit unknown.

The epithet of *Mascagnia aequatorialis* refers to the source of its type and only known collection, which came from just south of the equator in the country named for the equator (Fig. 1). In spite of the immaturity of the type and the lack of samaras, we have no doubt that it belongs in *Mascagnia* sens. str., because no other

FIG. 2. *Mascagnia aequatorialis*. a. Flowering branch from old stem, crossed by younger stem, ×0.5. b. Node showing stipules and petiolar glands, ×4. c. Enlargement of abaxial surface of lamina showing gland and appressed vesture, ×5. d. Detached large leaf, ×0.5. e. Flower bud and portion of inflorescence axis, ×2.5. f. Stamen from bud, ×7.5. g. Gynoecium from bud, ×7.5. (Based on *Cerón M. & Iguago 5475*, MICH.)

genus shows this combination of interpetiolar stipules, basally biglandular petioles, impressed leaf glands, elongated many-flowered pseudoracemes, bracteoles with one of each pair bearing a large eccentric abaxial gland, and pink carinate petals. Within the *M. cordifolia* group, *M. aequatorialis* is immediately distinguished by its metallic-sericeous leaves, and its wet-forest habitat also sets it apart; it is far-disjunct from the other members of the group. The thick stems to which the leafy branches of the type are attached suggest that this plant is a large, woody liana.

**Mascagnia affinis** W. R. Anderson & C. Cav. Davis, sp. nov.—TYPE: BRAZIL. Mato Grosso: Rod. MT-265, Km 60–70 do trevo com a Rod. BR-174 (Mun. Porto Espiridião), cerrado, 27 Oct 1995 fl/imm fr, *Hatschbach 63949* (holotype: MBM!; isotype: MICH!).

*Mascagniae cordifoliae* affinis, sed laminis supra subsericeis et subtus dense et pertinaciter subsericeis vel tomentosis.

Woody vine, the stems persistently brown-velutinous or subsericeous. Lamina of larger leaves 5–17 cm long, 3.5–11 cm wide, elliptical or (mostly) ovate to rotund, sometimes wider than long, truncate, rounded, or cordate at base, acute or abruptly short-acuminate or apiculate to rounded at apex, subsericeous above with the very short hairs appressed to somewhat raised and often abraded in age, densely and persistently subsericeous to tomentose below with the hairs dense enough to touch over the whole surface, varying from nearly straight and appressed to raised and many hairs sinuous to twisted, bearing an abaxial row of 2–4 impressed glands on each side between midrib and margin with the most proximal glands remote from base, the principal lateral veins 4–7 on each side; petiole 7–35 mm long, persistently brown-velutinous or tomentose, biglandular at base with the glands 0.5–1.2 mm in diameter; stipules 1–1.5 mm long, narrowly triangular, loosely sericeous, borne on stem between petioles. Inflorescences axillary or terminal, 2–9 cm long, unbranched pseudoracemes containing 10–40 or more crowded to somewhat distant flowers, the axes (including peduncles) brown- or stramineous-velutinous or tomentose or subsericeous; bracts 1–2 mm long, narrowly triangular, eglandular or the lowest pair biglandular; peduncle 5–12 mm long; bracteoles 0.8–1.5 mm long, 1 or both borne up to 3 mm below apex of peduncle, 1 of each pair usually eglandular and symmetrically triangular, the other bearing 1 prominent eccentric discoid gland 0.5–1.1 mm in diameter and asymmetrically lanceolate or falcate, sometimes 1 bracteole bearing 2 glands or both bracteoles bearing 1 gland; bracts and bracteoles loosely sericeous; pedicel 4–8 mm long, loosely sericeous, the hairs white. Sepals 1 mm long beyond glands, triangular or ovate, rounded at apex, abaxially densely sericeous, adaxially glabrous, appressed in anthesis; glands 2–2.5 mm long, 8 on 4 lateral sepals, the anterior sepal eglandular. Petals pink, glabrous, abaxially carinate or alulate with the keel or winglet 0.2–0.5 mm wide; lateral petals spreading or reflexed, the limb 4.5–5.5 mm long, 3.5–4.5 mm wide, denticulate or erose at margin, the claw 1–1.5 mm long; posterior petal with claw erect and limb reflexed, the limb 4.5–5 mm long, 3 mm wide, corrugated, dentate or lacerate at margin, the claw 1.5 mm long. Stamens glabrous; filaments distinct, 1.5–2.5 mm long, longer opposite sepals than opposite petals; anthers 1.2–1.5 mm long, ± alike. Ovary 1.2 mm high, densely sericeous; styles glabrous, 2–2.5 mm long, alike, erect from base, straight or distally recurved, dorsally rounded or truncate at apex. Samara thinly sericeous on wing, tomentose on nut, orbicular or broadly ovate, the lateral wing membranous, 20–30 mm high and wide, continuous at base and apex, entire or shallowly emarginate at base, notched up to halfway to nut at apex; dorsal wing 9–12 mm high, 3–4 mm wide, triangular or rounded; ventral areole ca 4 mm high, 2–3 mm wide, ovate.

Phenology. Collected with flowers and fruits in October and November.

Distribution (Fig. 1). Southwestern Mato Grosso, Brazil, and adjacent Bolivia; cerrado and forest; 155–416 m.

ADDITIONAL SPECIMENS EXAMINED. **Bolivia**. SANTA CRUZ: Roboré, *Cárdenas 2974* (F); Prov. Velasco: Serrania de Huanchaca, P. N. Noel Kempff, 14°37'S, 60°42'W, *Foster 13721* (F); P. N. Noel Kempff, 14°33'19"S, 60°55'55"W, *Gerlach et al. 17/01 & 19/01* (MICH); Campamento El Refugio, 14°33'30"S, 60°45'41"W, *Guillén & Salvatierra 2307* (MICH); P. N. Noel Kempff, 25 km de Los Fierros, 14°33'30"S,

60°49'12"W, *Killeen et al. 5841* (MICH). **Brazil**. MATO GROSSO: Mun. Cáceres a 45 km S da cidade de Pontes e Lacerda, 15–16°S, 59–60°W, *Cid Ferreira 6573* (MICH, NY).

This species is similar in most characters to *Mascagnia cordifolia*, which is why we chose an epithet meaning "near." However, while the many collections of *M. cordifolia* studied consistently have the lamina velutinous on both sides with V-shaped hairs, the plants treated here as *M. affinis* have the lamina subsericeous above and subsericeous to tomentose below. One collection not cited above merits comment. *Guillén & Roca 2495* (MICH), from Velasco, Santa Cruz, Bolivia, at 14°22'S, 61°09'W, is intermediate in its leaf vesture between *M. affinis*, which is known from the same general area, and *M. cordifolia*, which has not been collected in Santa Cruz. It may be that the two closely related species both occur in Velasco and hybridize there.

**Mascagnia aptera** W. R. Anderson, Contr. Univ. Michigan Herb. 14: 17. 1980.—TYPE: BRAZIL. Mato Grosso: Chapada dos Guimarães, 22 Oct 1973 fl/fr, *Prance et al. 19274* (holotype: INPA!; isotypes: MICH! NY! US!). Fig. 3.

Scandent subshrub, the stems velutinous to glabrate. Lamina of leaves 2.5–5.8 cm long, 1.8–5 cm wide, broadly elliptical or suborbicular, cordate at base, rounded and apiculate at apex, rugose above and persistently velutinous with the hairs sessile and V-shaped or short-stalked and Y-shaped, densely and persistently white-lanate below with the hairs sessile, long and soft, substraight or twisted, appressed or somewhat spreading, with 3–4 impressed glands on each side of abaxial surface in a row between margin and midrib, the most proximal glands remote from base; petiole 2–5 mm long, velutinous, bearing 2 large glands at or just above base; stipules 0.4 mm long, triangular, borne on stem between petioles. Inflorescences axillary and terminal, unbranched pseudoracemes 2–3.5 cm long, containing 6–14 flowers crowded in distal half, the axis velutinous or loosely sericeous; bracts 1–2 (–3) mm long, narrowly triangular or subulate, eglandular or the lowest pair biglandular; peduncle 4–5.5 mm long, velutinous; bracteoles borne slightly below apex of peduncle, 1 of each pair 1–1.5 mm long, eglandular, narrowly linear or subulate, the other 1.5–2 mm long, bearing 1 large eccentric abaxial gland, falcate; bracts and bracteoles velutinous; pedicel 2.5–5.5 mm long, pilose-sericeous. Sepals 0.5–1 mm long beyond glands, ovate or triangular, obtuse or rounded at apex, abaxially densely pilose-sericeous, adaxially glabrous, appressed in anthesis; glands ca 2 mm long, 8 on 4 lateral sepals, the anterior sepal eglandular. Petals reddish pink, glabrous; lateral petals spreading or reflexed, the limb 4.8–5 mm long, 3–3.5 mm wide, erose or denticulate at margin, abaxially alulate with the winglet 0.4 mm wide, the claw 1–1.2 mm long; posterior petal erect, the limb 5.5 mm long, 3 mm wide, flat or corrugated, proximally denticulate and distally fimbriate at margin, abaxially carinate, the claw 1–1.2 mm long. Stamens glabrous; filaments connate at base, 2.1–2.5 mm long, longer opposite sepals than opposite petals; anthers 1.3–1.5 mm long, ± alike. Ovary 1.2 mm high, loosely pilose-sericeous; styles glabrous, 2.5 mm long, ± alike, straight and erect or diverging distally, dorsally rounded at apex. Samara pilose, reduced to a nut 3.5–4 mm long bearing a dorsal crest 0.5–1.5 mm wide, the lateral wing completely absent; ventral areole 3.5 mm high, ovate.

This peculiar species is still known only from the type, which was collected among sandstone rocks at 720 m in October. Its samara has lost the large membranous lateral wing found in almost all other species of *Mascagnia* sens. str. In that loss *M. aptera* is unique; unlike most of the larger samara-bearing genera, *Mascagnia* sens. str. has not experienced the repeated loss of wings discussed by Anderson (2001, pp. 84–85). Indeed, the samaras of *Mascagnia* are so conserved as to make them of

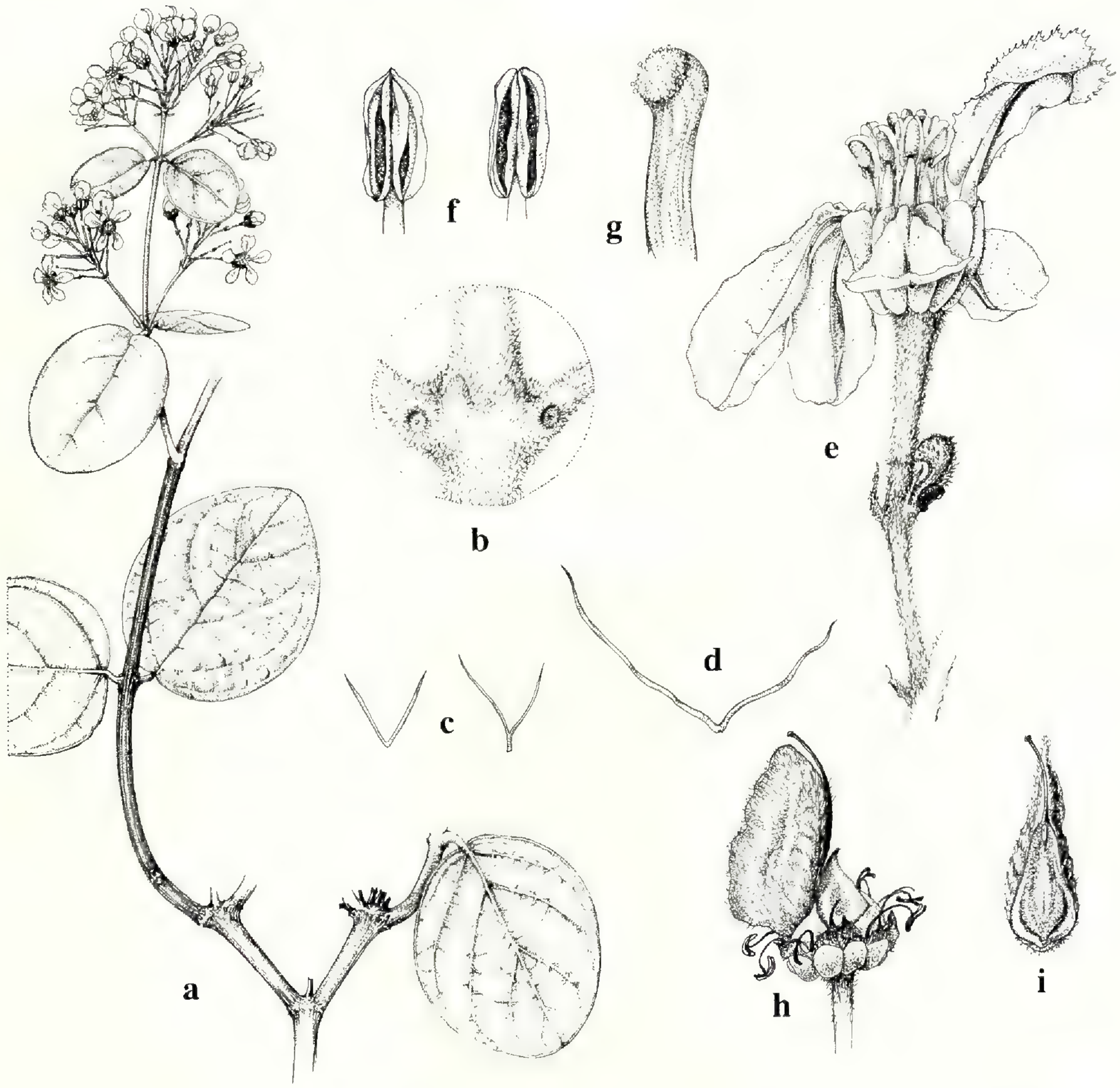


FIG. 3. *Mascagnia aptera*. a. Flowering branch, ×0.5. b. Node showing stipules and petiolar glands, ×5. c. Hairs from adaxial surface of lamina, ×35. d. Hair from abaxial surface of lamina, ×35. e. Flower, ×5. f. Anthers, left opposite petal, right opposite sepal, ×12.5. g. Distal portion of style, ×30. h. Fruit with 2 samaras removed, ×4. i. Samara, adaxial view, ×4. (Based on *Prance et al. 19274*, MICH.)

limited taxonomic value in most cases. Aside from that difference, *M. aptera* strongly resembles *M. cordifolia*, which is a vigorously twining woody vine with larger leaves that are densely velutinous on both surfaces; its stipules are also longer.

**Mascagnia cordifolia** (Adr. Juss. in A. St.-Hil.) Griseb. in Mart., Fl: Bras. 12(1): 95. 1858. *Hiraea cordifolia* Adr. Juss. in A. St.-Hil., Fl. Bras. Merid. 3: 19, pl. 164. 1833 ["1832"].—TYPE: BRAZIL. Near Curumatahy [=Curimataí, Minas Gerais?], *A. St.-Hilaire* (lectotype, designated by W. R. Anderson, 1993: P!; isolectotypes: P!). Fig. 4.

*Hiraea cordifolia* var. *mollifolia* Adr. Juss. in A. St.-Hil., Fl. Bras. Merid. 3: 19. 1833 ["1832"].—TYPE: BRAZIL. Goiás: "Mato Grosso," *A. St.-Hilaire Cat. C1 no. 840* (lectotype, here designated: P!, the sheet shown in WRA negative 81-21-16 [MICH]; isolectotypes: P!).

*Mascagnia rubra* Griseb. in Mart., Fl. Bras. 12(1): 90. 1858.—TYPE: BRAZIL. Tocantins ["Goiás"]: Natividade, *Gardner 3067* (isotype: K!).

*Mascagnia cordifolia* var. *cornifolia* Griseb., Vidensk. Meddel. Dansk. Naturhist. Foren. Kjøbenhavn 1875: 147. 1875.—TYPE: BRAZIL. Minas Gerais: Lagoa Santa [fide Grisebach] (holotype: B-W 8862, microfiche!).

*Hiraea volubilis* S. Moore, Trans. Linn. Soc. London, Ser. 2, Bot., 4: 328. 1895.—TYPE: BRAZIL. Mato Grosso: "Santa Cruz," Oct–Nov 1891 fl, *Moore 647* (lectotype, here designated: BM!; isolectotypes: K! NY! P!).

*Mascagnia cordifolia* var. *cinerascens* Skottsb., Kongl. Svenska Vetenskapsakad. Handl. 35(6): 4. 1901.—TYPE: BRAZIL. Mato Grosso: Cuiabá, *Malme 1364* p.p. (7/2/1894 fl/fr) (holotype: S!; isotypes: S!).

*Mascagnia cordifolia* var. *fusca* Suess., Repert. Spec. Nov. Regni Veg. 42: 46. 1937.—TYPE: BRAZIL. Acre: Rio Macauhan, 4 Sep 1933 fl, *Krukoff 5781* (holotype: M; isotypes: F! G! K! MICH! MO! NY! U!).

Woody vine, often forming thickets, the stems persistently brown-velutinous. Lamina of larger leaves 6–15 (–20) cm long, 5–10 (–12) cm wide, broadly elliptical or (mostly) ovate to rotund, broadly cuneate, rounded, or cordate at base, abruptly short-acuminate or apiculate to rounded at apex, persistently velutinous above (or the hairs abraded in age) with the hairs V-shaped from a swollen base, densely and persistently velutinous below with the hairs V-shaped, bearing an abaxial row of 2–7 impressed glands on each side between midrib and margin with the most proximal glands remote from base, the principal lateral veins 5–6 on each side and connected by scalariform cross-veins; petiole 7–25 (–30) mm long, persistently brown-velutinous, biglandular at base with the glands 1–2 mm in diameter; stipules 1–3 mm long, narrowly triangular, loosely sericeous, borne on stem between petioles. Inflorescences axillary, 2–22 cm long, unbranched or sometimes branched near middle and then a panicle of 3 (–5) pseudoracemes, each pseudoraceme containing 10–50 crowded to distant flowers, the axis (including peduncles) brown- (rarely white- or stramineous-) velutinous; bracts 1–3.5 mm long, narrowly triangular or subulate, eglandular (very rarely bearing 2 tiny marginal glands at base); peduncle 4–10 mm long; bracteoles 1–2 mm long, borne at apex of peduncle or up to 2 mm below, usually 1 of each pair eglandular and symmetrically triangular, the other bearing 1 prominent eccentric discoid gland 0.7–1.5 mm in diameter and asymmetrically lanceolate or falcate, sometimes 1 bracteole bearing 2 glands or both bracteoles bearing 1 gland; bracts and bracteoles abaxially velutinous or subsericeous; pedicel 4–9 mm long, velutinous to loosely sericeous, the hairs white. Sepals 1–1.5 mm long beyond glands, ovate or triangular, obtuse or rounded at apex, abaxially densely sericeous, ciliate on margin, adaxially glabrous, appressed in anthesis; glands 1.5–3 mm long, 8 on 4 lateral sepals, the anterior sepal eglandular (?) or its glands connate with adjacent glands. Petals pink or pink and white, glabrous; lateral petals spreading or reflexed, the limb 4–6 mm long, 3–5 mm wide, entire or denticulate at margin, abaxially ± prominently alulate with the winglet 0.3–0.6 mm wide, the claw 1–1.6 mm long; posterior petal erect, the limb 5–6 mm long, 3.5–4 mm wide, corrugated, dentate or short-fimbriate at margin, abaxially proximally carinate or alulate with the keel 0.2–0.3 mm wide, the claw 1.5 mm long. Stamens glabrous; filaments connate at very base, 1.5–2 mm long, longer opposite sepals than opposite petals; anthers 1.3–1.8 mm long, ± alike. Ovary 1.5 mm high, densely pilose; styles glabrous, 1.5–2.5 mm long, alike or the anterior slightly shorter and slenderer than the posterior 2, erect from base, straight or distally recurved, dorsally rounded or truncate (to rarely apiculate) at apex. Samara thinly sericeous on wing, tomentose on nut, orbicular or wider than high, the lateral wing membranous, (16–) 20–35 mm high, (20–) 25–40 mm wide, continuous at base and

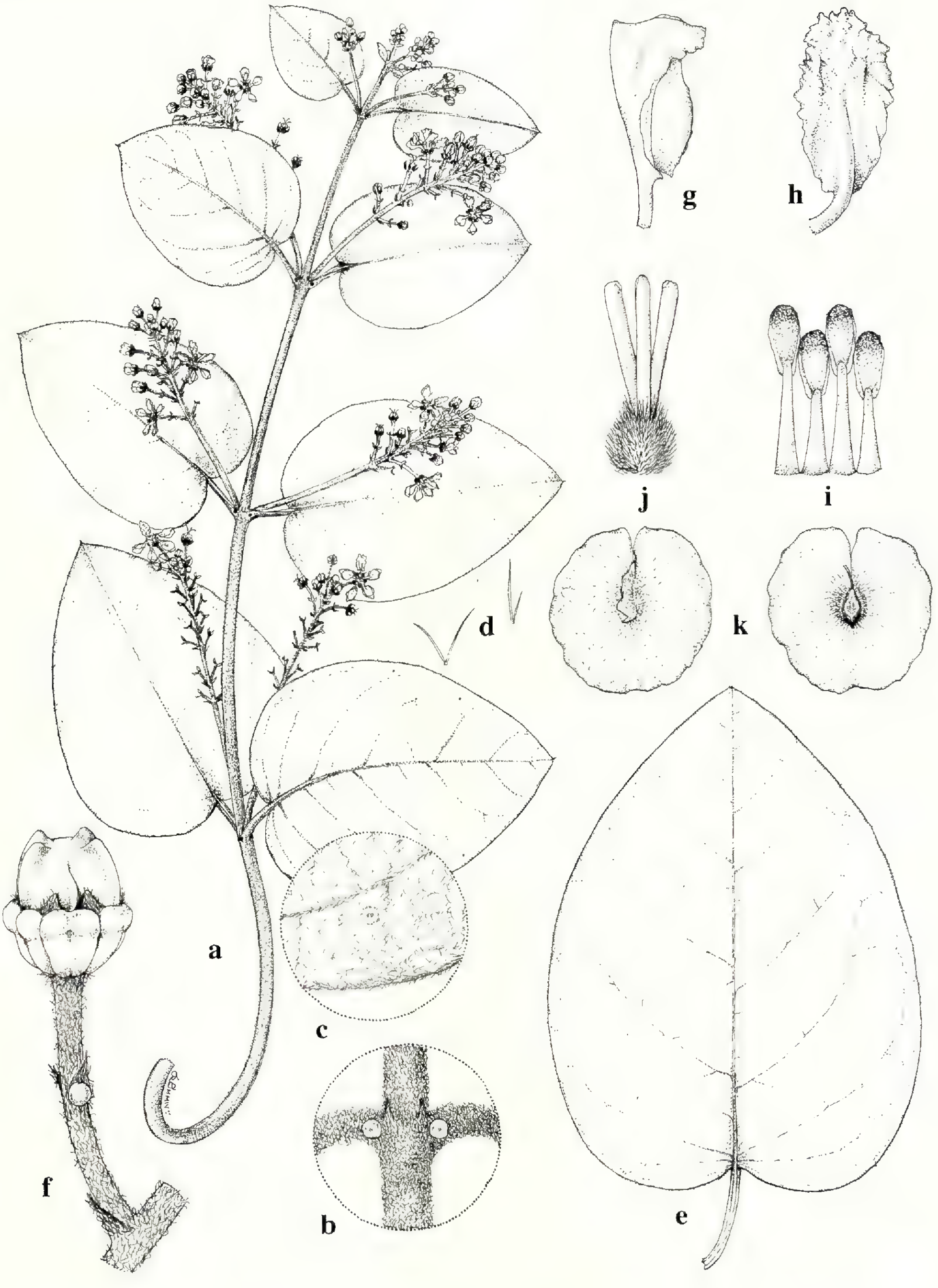


FIG. 4. *Mascagnia cordifolia*. a. Flowering branch, ×0.5. b. Node showing stipules and glands at base of petioles, ×2.5. c. Enlarged portion of abaxial surface of lamina, showing vesture and gland, ×2.5. d. Hairs from abaxial surface of lamina (left) and adaxial surface (right), ×15. e. Large leaf, adaxial view, ×0.5. f. Flower bud and portion of inflorescence axis, ×3.5. g. Lateral petal, side view, ×5. h. Posterior petal, abaxial view, ×5. i. Abaxial view of four stamens, those with longer filaments opposite sepals, ×7.5. j. Gynoecium, ×7.5. k. Samaras, abaxial view (left) and adaxial view (right), ×0.75. (Based on: a–d, *Schiavini 69*, MICH; e, *Hatschbach 49588*, MICH; f–j, *Silva et al. 2314*, MICH; k, *Anderson 11311*, MICH.)

apex, notched up to halfway to nut at apex; dorsal wing 8–16 mm high, 2–5 mm wide, triangular and widest at base or irregular in shape; ventral areole 3–4 mm high, 2 mm wide, ovate.

Phenology. Collected with flowers and fruits in all months, but most commonly from August through December.

Distribution (Fig. 1). Southern Brazil from about 10°S to about 24°S (except Bahia) and adjacent Bolivia, with outlier populations farther north in Amazonas and Pará; most often in cerrado but also in campo, thickets, secondary forest, and at the edge of wet forest; 230–1400 m.

Representative Specimens. **Bolivia**. Beni, Prov. Vaca Diez: Riberalta 53 km hacia el S, *Beck 20464* (MICH); E side of Riberalta, 11°00'S, 66°05'W, *Solomon 6259* (MICH, MO, NY).—Pando: Prov. Manuripi, 30 km al N de Puerto América, 11°35'39"S, 68°02'52"W, *Jardim et al. 2432* (MICH). **Brazil**. Amazonas: Estrada Manaus–Itacoatiara Km 104, *Coêlho et al. s.n.* [INPA 21231] (US); Manaus –Itacoatiara road Km 214, *Prance et al. 4889* (NY).—Distrito Federal: Catetinho, 15 km SW of Brasília, *Irwin & Soderstrom 6150* (MO, NY); Córrego Jeriva, 10 km E of Brasília, *Irwin et al. 8351* (MO, NY); Fazenda Água Limpa, 15°58'25"S, 47°54'37"W, *Pereira Neto & Alvarenga 368* (MICH).—Espírito Santo: Reserva Natural da CVRD, Linhares, estrada Santa Terezinha, *Folli 3809* (MICH). —Goiás: Chapada dos Veadeiros, E of Alto Paraíso on road to Nova Roma, *Anderson 6583* (NY); Chapada dos Veadeiros, 7 km de Colinas/Cavalcante, *Silva et al. 2314* (MICH); Mun. Niquelândia, 4 km de Niquelândia, 14°26'38"S, 48°26'13"W, *Fonseca et al. 1151* (MICH); Mun. Caldas Novas, 9 km NW of Caldas Novas, 17°43'S, 48°42'W, *Heringer & Eiten 14225* (MICH, MO); Serra do Caiapó, 50 km S of Caiapônia on road to Jataí, *Irwin & Soderstrom 7341* (MICH, MO, NY); 70 km SE of Aragarças on road to Piranhas, *Irwin et al. 17650* (MICH, NY); Mozarlândia, *Pereira 364* (MICH).—Mato Grosso do Sul: Mun. Rio Verde, near Rio Verde, *Anderson 11246* (MBM, MICH, MO, NY); Pantanal do Rio Negro, 19°30'S, 56°10'W, *Dubs 355* (MICH); Mun. Bataguaçu, Porto XV, *Hatschbach 24993* (NY); Mun. Nioaque, *Hatschbach 52433* (MICH, MO); Mun. Aquidauana, Serra de Maracaju, *Hatschbach 63403* (MICH).—Mato Grosso: 1 km S of Rondonópolis, *Anderson 11311* (MBM, MICH, MO, NY); Ribeirão Claro, NW of Alto Araguaia, *Anderson 11398* (MBM, MICH, NY); Mun. Alto Paraguay, road Curupira–Arenápolis, 14°57'S, 56°51'W, *Dubs 1706* (MICH); Mun. Barra do Garças, Vale do Sonho, *Hatschbach 40129* (MICH); Mun. Chapada dos Guimarães, Água Fria, *Hatschbach 66852* (MICH); 2 km S of Xavantina, 14°40'S, 52°20'W, *Irwin & Soderstrom 6299* (MICH, NY); 50 km N of Barra do Garças on road to Xavantina, *Irwin & Soderstrom 6893* (MICH, MO, NY); 200 km NW of Cuiabá, *Maguire et al. 56857* (MICH, NY).—Minas Gerais: entre Pirapora e Montes Claros, *Castellanos 24213* (NY); Triángulo region, *Goodland 840* (MICH, NY); Mun. Oliveira, Córrego Dias, *Hatschbach 49588* (MICH); 12 km W de Itapagipe, *Krapovickas & Cristóbal 42763* (MICH); Campina Verde, *Macedo 5583* (MICH); Mun. Santana do Riacho, Distr. Cardeal Mota, *Martins 3* (MICH); Mun. Uberlândia, Est. Ecol. do Panga, *Schiavini 69* (MICH); Mun. Belo Horizonte, Morro das Pedras, *Williams & Assis 7460* (MO).—Pará: Serra dos Carajás, Serraria km 12, *Silva & Ribeiro 3653* (MICH).—Rondônia: 13 km de Vilhena, estrada para Chapada dos Parecis, 12°45'S, 60°10'W, mata alta, *Vieira et al. 903* (MICH, MO, NY).—São Paulo: Mun. São Carlos, São Carlos, *Campos 41* (MO); Mun. Rancharia, *Hatschbach 34810* (MICH); Mun. Avaré, Represa Jurumirim, *Hatschbach 45643* (MICH); Mun. Pirassununga, *Pickel s.n.* [SPSF-727] (MICH).

This common and widespread species is morphologically rather uniform throughout most of its range. The disjunct populations in Amazonas and Pará (see Fig. 1) that are assigned here to *M. cordifolia* agree in most or all respects with the populations of the Planalto cerrados. The single collection known from Espírito Santo is atypical in several characters. Its lamina is not as densely velutinous as in most populations, the petiole and bracteole glands are small, the stem and inflorescence hairs are not as erect as usual, and the petals are only carinate, not alulate. Yet, in a qualitative sense the plant of Espírito Santo agrees reasonably well with *M. cordifolia*, and there is no other described species that could accommodate it, so for the present it is best left in this species with its closest relatives.

Not treated here is the following collection: Brazil. Pará: Approx. 70 km from Tucuruí, 65 km SSW on old BR422, then 5 km NW on new logging road, 04°11'S, 49°44'W, forest on terra firme, Nov fr, *Daly et al. 1436* (MICH, MO, NY). This plant

resembles *M. cordifolia* in most characters, including large glands at the base of the petiole. However, the collectors did not give a petal color and we can find no old petals that would tell us whether or not they were alulate. The lamina is short-velutinous above and subsericeous below, such that these specimens are somewhat intermediate between *M. affinis* and *M. cordifolia* in their vesture. As Fig. 1 shows, the only other collection from near this locality is the single one we have cited from Pará, from the Serra dos Carajás. The best disposition of *Daly et al. 1436* will have to await further study of *Mascagnia* sens. str., which may be aided by additional collections from Pará when they become available.

There is another species of *Mascagnia* in the Amazon, *M. strigulosa* (Rusby) Nied. in Engl., that resembles *M. cordifolia*, because it has pink (or lilac) petals, leaves that are persistently velutinous on both sides, axillary pseudoracemes, a large gland on one of each pair of bracteoles, and erect to divergent styles. *Mascagnia strigulosa* is easily excluded from this group of species because its petioles are always eglandular. It further differs from *M. cordifolia* in having 2–4 large glands (1–2 mm in diameter) at the abaxial base of the lamina, and its lateral petals are only carinate, with a narrow keel ca 0.1 mm wide.

**Mascagnia glabrata** W. R. Anderson & C. Cav. Davis, sp. nov.—TYPE: BRAZIL. Rondônia: Mineração Taboca, 10°15'S, 63°20'W, capoeira, solo pedregoso, 11 Oct 1979 fl/imm fr, *Vieira, Zarucchi, Silva, Mota & Ramos 390* (holotype: INPA!; isotypes: MICH! NY!).

*Mascagniae cordifoliae* affinis, sed laminis supra sparsim velutinis vel glabratis et subtus sparsim sericeis vel glabratis.

Woody vine, the stems persistently brown-velutinous or subsericeous or glabrescent in age. Lamina of larger leaves 8–16 cm long, 6–10.5 cm wide, ovate, rounded or cordate at base, acuminate to rounded and apiculate at apex, thinly velutinous to glabrate above, the V- or Y-shaped hairs dense enough to touch only on midrib and lateral veins, thinly sericeous to glabrate below, the mostly ± straight, sessile or short-stalked hairs dense enough to touch only on midrib and lateral veins, bearing an abaxial row of 2–5 impressed glands on each side between midrib and margin with the most proximal glands remote from base, the principal lateral veins 5–7 on each side and connected by scalariform cross-veins; petiole 10–30 mm long, brown- or whitish velutinous or tomentose or subsericeous, biglandular at base with the glands 1–2 mm in diameter; stipules 1–2 mm long, narrowly triangular, loosely sericeous, borne on stem between petioles. Inflorescences axillary or terminal, 4–16 cm long, unbranched or sometimes branched near middle and then a panicle of 3 pseudoracemes, each pseudoraceme containing 15–65 flowers, the axis (including peduncles) brown-velutinous or subsericeous; bract 1.3–2 mm long, narrowly triangular, eglandular; peduncle 8–14 mm long; bracteoles 0.7–2 mm long, borne at apex of peduncle or up to 2 mm below, 1 of each pair eglandular and symmetrically triangular, the other bearing 1 prominent eccentric discoid gland 0.8–1.1 mm in diameter and ± asymmetrically lanceolate or falcate; bracts and bracteoles loosely sericeous; pedicel 4–6 mm long, sericeous or subsericeous, the hairs white. Sepals ca 1 mm long beyond glands, triangular or ovate, obtuse or rounded at apex, abaxially densely sericeous or distally glabrous, adaxially glabrous, appressed in anthesis; glands 2–3 mm long, 8 on 4 lateral sepals, the anterior sepal eglandular. Petals pink, glabrous; lateral petals spreading or reflexed, the limb 4.5–6 mm long, 3–6 mm wide, denticulate or erose at margin, abaxially carinate or alulate with the keel or winglet 0.2–0.5 mm wide, the

claw 1–1.5 mm long; posterior petal erect, the limb 4.5–5 mm long, 4 mm wide, corrugated, dentate or short-fimbriate at margin, abaxially carinate with the keel 0.1–0.3 mm wide, the claw 1.5 mm long. Stamens glabrous; filaments connate at base, 1.7–2 mm long, wider opposite petals than opposite sepals, slightly longer opposite sepals than opposite petals; anthers 1.3–1.6 mm long, ± alike. Ovary 1–1.5 mm high, densely sericeous; styles glabrous or sericeous at base, 2–2.5 mm long, alike or the anterior slightly shorter than the posterior 2, erect from base, straight or distally recurved, dorsally rounded or truncate at apex. Immature samara thinly sericeous on wing, tomentose on nut, orbicular, the lateral wing membranous, 25–30 mm high and wide, continuous at base and apex, entire at base, notched 1/2–3/4 to nut at apex; dorsal wing 10 mm high, 4 mm wide, triangular; ventral areole ca 4 mm high, 3 mm wide, ovate.

Phenology. Collected with flowers from September to November, and with fruits in October.

Distribution (Fig. 1). Western Brazil, northern Bolivia, and southeastern Peru between about 10°S and 15°S; in thickets and high wet forest; 270–580 m.

Additional Specimens Examined. **Bolivia**. La Paz: Prov. Abel Iturralde, Parque Nacional Madidi, bosque tropical lluvioso primario, *Macia et al. 4644* (580 m, May ster, MICH) & *6929* (320 m, Mar ster, MICH). **Brazil**. Mato Grosso: Aripuanã, near Humboldt Centre on road to Rio Juruena, 10°12'S, 59°21'W, forest on terra firme, Oct fl, *Lleras & Lima P18256* (MICH); Mun. Porto dos Gaúchos, 59.5 km W of Rio Teles Pires on road to Porto dos Gaúchos, 11°40'S, 56°17'W, Sep fl, *Thomas et al. 3986* (MICH). **Peru**. Madre de Dios: Prov. Manu, Parque Nacional Manu, Río Manu, 11°56'S, 71°16'W, 350 m, high forest on low floodplain, Sep fl, *Foster 13254* (MICH); Prov. Tambopata, Distr. Puerto Maldonado, Cusco Amazónico, 13°08'S, 69°36'W, 270–300 m, bosque primario, Nov fl, *Valenzuela & Huamantupa 1015* (MICH).

Like *Mascagnia affinis*, *Mascagnia glabrata* is a segregate from *M. cordifolia*, differing from it in the vesture of the leaves, which are thinly velutinous to glabrate above and thinly sericeous to glabrate below.

## ACKNOWLEDGMENTS

We are grateful to Christiane Anderson for her helpful advice, to Karin Douthit for drawing the illustrations, to Scott Mori for his helpful review, and to the curators of the following herbaria for giving us access to their collections and for sending specimens to MICH as gifts and loans: BM, CEN, CTES, CVRD, F, G, IBGE, INPA, K, LPB, M, MA, MBM, MICH, MO, NY, P, S, SPSF, U, US, Z.

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Contr. Univ. Michigan Herb. 24: 45–49. 2005.

# TRANSFER OF MASCAGNIA LETICIANA TO MALPIGHIA (MALPIGHIACEAE)

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ABSTRACT. *Mascagnia leticiana* W. R. Anderson is transferred to *Malpighia* to become *Malpighia leticiana* (W. R. Anderson) W. R. Anderson & C. Cav. Davis, on the basis of a new phylogenetic analysis of DNA sequences and morphological characters. The morphology of *M. leticiana* is illustrated and discussed in the context of the problem of distinguishing between *Malpighia* and *Mascagnia*.

Anderson (1990) assigned *Mascagnia leticiana* W. R. Anderson to *Mascagnia* because of its samara-like fruit. In a new, unpublished phylogenetic analysis of Malpighiaceae, *Mascagnia leticiana* is nested within a very strongly supported *Malpighia* clade (see Fig. 1). The purpose of this paper is to transfer this species from *Mascagnia* to *Malpighia*, and to discuss its morphology and the problem of distinguishing between *Malpighia* and *Mascagnia*.

**Malpighia leticiana** (W. R. Anderson) W. R. Anderson & C. Cav. Davis, comb. nov.
*Mascagnia leticiana* W. R. Anderson, Contr. Univ. Michigan Herb. 17: 48. 1990. Fig. 2a–g.

This species could fit into either *Malpighia* or *Mascagnia* in terms of its stipules, leaf glands, petal color, androecium, and gynoecium; those characters support Anderson's contention (1990) that *Malpighia* and *Mascagnia* are closely related, but do not provide a basis for assigning *M. leticiana* to one genus or the other. On the other hand, the golden needle-like hairs of *M. leticiana* are found in no species of *Mascagnia* but are common in *Malpighia*, and no species of *Mascagnia* forms trees 6 m tall, which was the size of the type and only known collection of *M. leticiana*; such trees do occur in *Malpighia*. On both of these bases *M. leticiana* belongs in *Malpighia*. In addition, the short axillary umbels of *M. leticiana* are like the inflorescences of many (but not all) species of *Malpighia*, whereas most species of *Mascagnia* have the flowers ultimately borne in pseudoracemes. This character, however, should be interpreted with caution, because the umbels of *Malpighia* are condensed pseudoracemes and the inflorescence may not prove to be a reliable discriminator between these genera (Anderson 2001).

The real problem with *M. leticiana* lies in its fruits. *Malpighia* and *Mascagnia* have, for the most part, very different fruit types. In *Malpighia* the fruit is a fleshy bird-dispersed berry, indehiscent except in *M. albiflora* (Cuatrec.) Cuatrec. and *M. verruculosa* W. R. Anderson, in which the fleshy pyrenes grow apart as they mature and separate at maturity. In *Mascagnia* the fruit is dry and dehiscent, breaking apart at maturity into three membranous samaras with large lateral wings; for an example of those samaras, see the illustration in this volume of *Mascagnia cordifolia* (Adr. Juss.) Griseb. (Anderson & Davis 2005). This seemingly unequivocal distinction is weakened by the presence of rudimentary winglets on the pyrenes of *Malpighia*,

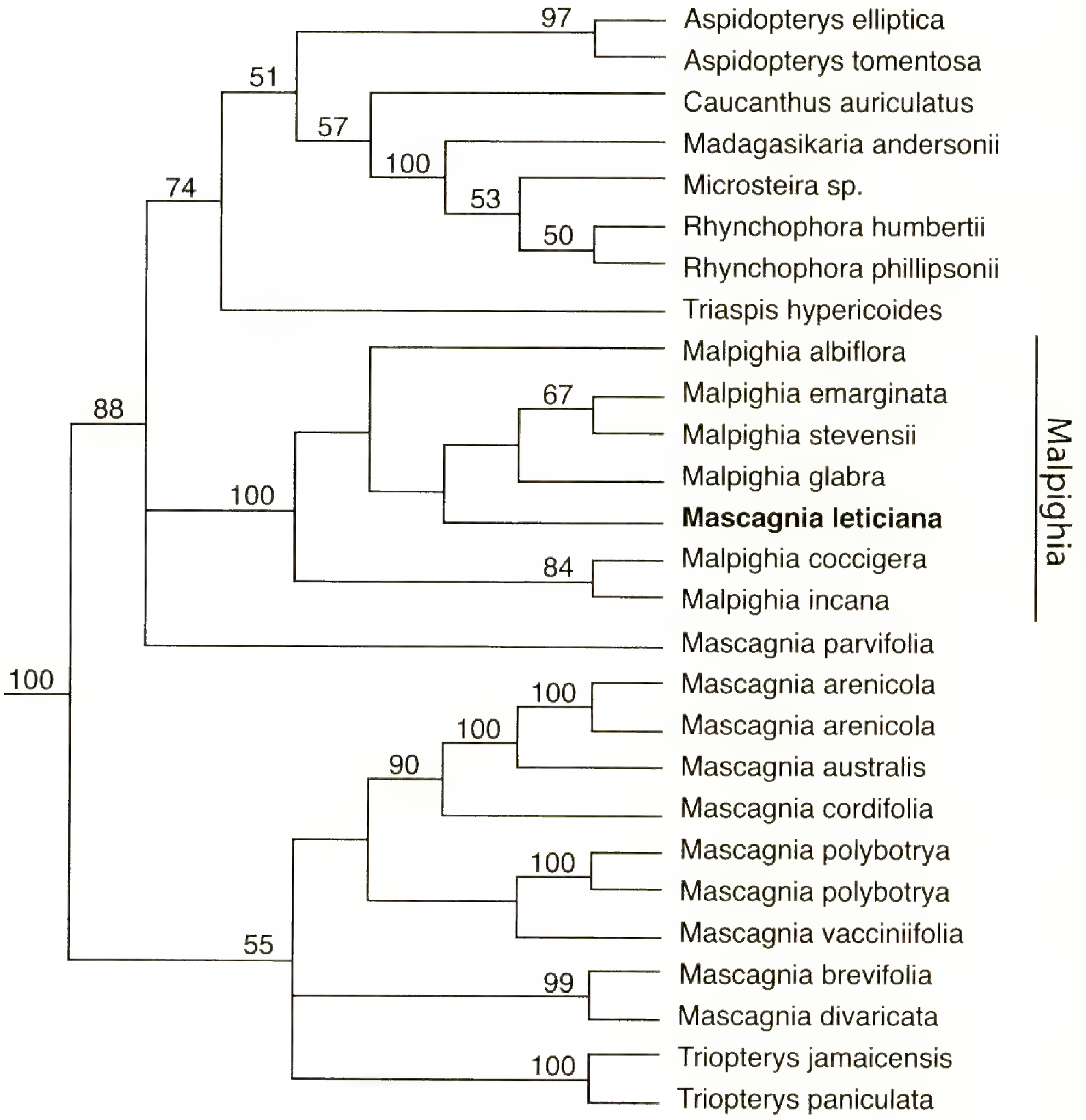


FIG. 1. Phylogenetic tree for 25 species of Malpighiaceae, representing the malpighioid clade (sensu Davis et al. 2001). Bootstrap values are given above branches for clades supported at ≥50%. The reduced strict consensus tree shown here is extracted from a larger phylogenetic analysis of Malpighiaceae using combined DNA sequences from plastid *matK*, *ndhF*, and *rbcL*, nuclear *PHYC*, and morphology; all genes were sequenced for all taxa (Davis & Anderson, unpublished data). Vouchers for collections sequenced are given in Appendix 1.

buried in the fleshy pericarp (Anderson 1978; see here Fig. 2h–j; note that the fruit shown in i and j was not dehiscent, but when the flesh holding the pyrenes together was removed the pyrenes could be separated). Those rudimentary winglets suggest the probable origin of *Malpighia* from a *Mascagnia*-like ancestor with a winged, wind-dispersed fruit. Nevertheless, for most species the distinction between *Malpighia* and *Mascagnia* is easy if one has fruits—if the fruit is indehiscent and fleshy the genus is *Malpighia*, and if it is dry, dehiscent, and samaroid the genus is *Mascagnia*.

When Anderson (1990) studied the immature fruits on the type of *M. leticiana*, he found them to be small and coriaceous (suggesting that they may have been somewhat fleshy), but conspicuously winged (Fig. 2g). The fruits were not dehiscent, but he had no difficulty separating the mericarps and concluded that they probably do separate at maturity. We have no way of knowing how fleshy the fruits may have been

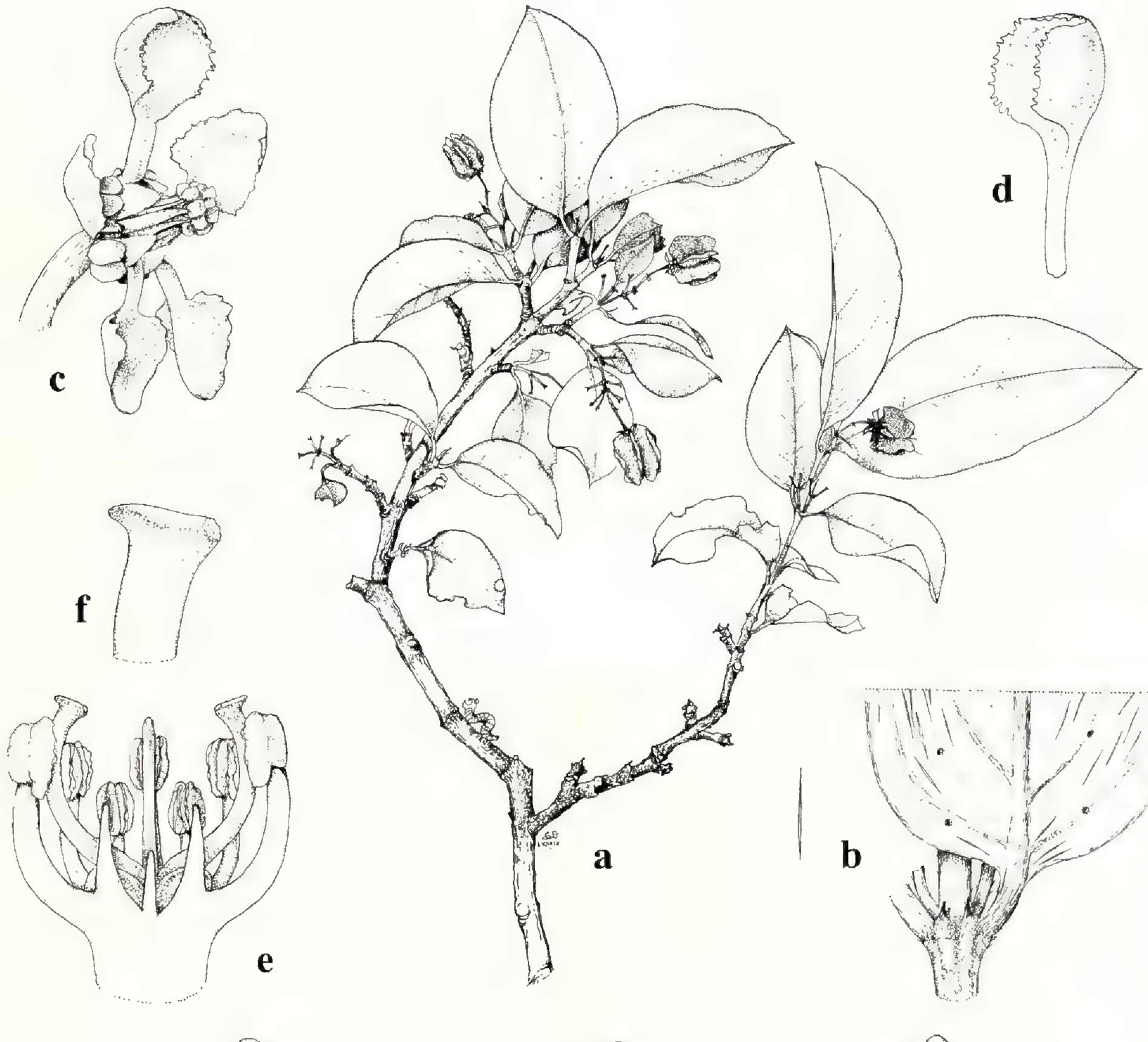


FIG. 2. *Malpighia leticiana*, *M. novogaliciana*, and *M. rzedowskii*. a–g, *M. leticiana*: a. Branch with fruits, ×0.5. b. Node and abaxial surface of leaf, ×2.5, with one needle-like hair enlarged, ×5. c. Flower, side view, with posterior petal uppermost, ×2.5. d. Posterior petal, ×4. e. Androecium and gynoecium, with anterior style in center and anthers removed from three posterior stamens, ×6. f. Apex of style, ×20. g. Three views of immature mericarps, one adaxial (in center) and two abaxial, ×1.5. h. *M. novogaliciana*: cross-section of immature fruit to show developing wings of pyrenes, ×1.5. i, j, *M. rzedowskii*: i. Dried fruit, intact, ×1.5. j. Pyrenes with flesh removed, adaxial view (left) and abaxial view (right), ×1.5. (Based on: a–g, *Torres C. 629*, MICH; h, *Bornstein 89b*, MICH; i, j, *McVaugh 16037*, MICH.)

before being dried. The mericarps of *M. leticiana* are perplexing because they do not quite resemble the samaras of *Mascagnia* or the pyrenes of any known species of *Malpighia*. Faced with this dilemma, Anderson chose to rely on the dry (?) dehiscent (?) winged fruits as the most reliable indicator of generic position and assigned the species to *Mascagnia*.

Given our new phylogenetic analysis and the morphological characters mentioned above, we now believe this species is best placed in *Malpighia*; however, it remains anomalous and problematic in that genus, too. Anderson suggested that *M. leticiana* might represent an intermediate between *Mascagnia* and *Malpighia*, "with small leathery samaras that became fleshy, thereby shifting from wind to birds as the agent of dispersal" (Anderson 1990, p. 48). There may still be some conceptual merit in thinking about this plant in that way, especially if future analyses place *M. leticiana* sister to the core fleshy-fruited *Malpighia* clade; however, at the moment there is very little support for the exact position of this species within *Malpighia* (Fig. 1). Alternatively, if *M. leticiana* is confirmed to be well nested within *Malpighia*, as suggested (albeit weakly) by Fig. 1, it will have to be considered a species in which an indehiscent fleshy fruit reverted to something that secondarily resembles a *Mascagnia*-like cluster of three samaras.

## ACKNOWLEDGMENTS

C. Davis was supported by NSF AToL (EF 04-31242), by a Rackham Faculty grant from the University of Michigan, and by the Michigan Society of Fellows. Figure 2 is a composite of drawings made by Karin Douthit at various times over the last 17 years; her talent and consistent production of beautiful drawings from difficult material are much appreciated.

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## APPENDIX 1

### VOUCHERS FOR SPECIES IN FIGURE 1

*Aspidopterys elliptica* (Blume) Adr. Juss.: *Bogor XVI.G.110* (BO)
*Aspidopterys tomentosa* (Blume) Adr. Juss.: *Tsi Zhanhuo 92-121* (MO)
*Caucanthus auriculatus* (Radlk.) Nied.: *Knox 2128* (MICH)
*Madagasikaria andersonii* C. Cav. Davis: *Davis 20-01* (A)
*Malpighia albiflora* (Cuatrec.) Cuatrec.: *Anderson 13815* (MICH)
*Malpighia coccigera* L.: *University of Michigan Botanical Garden 20626* (MICH)
*Malpighia emarginata* DC.: *Anderson 13621* (MICH)
*Malpighia glabra* L.: *Fairchild Tropical Garden X-12-104* (FTG)
*Malpighia incana* Mill.: *Fairchild Tropical Garden 81-303B* (FTG)
*Mascagnia leticiana* W. R. Anderson [= *Malpighia leticiana*]: *Torres C. 629* (MICH)
*Malpighia stevensii* W. R. Anderson: *Davis 1019* (MICH)
*Mascagnia arenicola* C. Anderson: *Chase 90160* (MICH); *Chase 90165* (MICH)
*Mascagnia australis* C. Anderson: *Anderson 13592* (MICH)

*Mascagnia brevifolia* Griseb.: *Nee 51409* (MICH)
*Mascagnia cordifolia* (Adr. Juss.) Griseb.: *Anderson 13626* (MICH)
*Mascagnia divaricata* (H. B. K.) Nied.: *Anderson 13604* (MICH)
*Mascagnia parvifolia* (Adr. Juss.) Nied.: *Salinas T. 5444* (MICH)
*Mascagnia polybotrya* (Adr. Juss.) Nied.: *Anderson & Laskowski 4098* (MICH); *McVaugh 24004* (MICH)
*Mascagnia vacciniifolia* Nied.: *Anderson 13797* (MICH)
*Microsteira* sp.: *Davis 38-01* (A)
*Rhynchophora humbertii* Arènes: *Davis 18-01 M* (A)
*Rhynchophora phillipsonii* W. R. Anderson: *Davis 23b-01* (A)
*Triaspis hypericoides* Burch.: *Immelman 650* (PRE)
*Triopterys jamaicensis* L.: *Hammel 17816* (MICH)
*Triopterys paniculata* (Mill.) Small: *Veloz et al. 862* (MICH)

Contr. Univ. Michigan Herb. 24: 51–108. 2005.

# CATALOG OF HONDURAN ACANTHACEAE WITH TAXONOMIC AND PHYTOGEOGRAPHIC NOTES

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ABSTRACT. A taxonomic revision of Honduran Acanthaceae based on field and herbarium studies reveals the presence of 96 species of that family in the country. Seventy-four of these species are treated as native to Honduras; eight of them are endemic there. Four of the endemic taxa, *Aphelandra molinae*, *Justicia pilzii*, *Pseuderanthemum liesneri,* and *Stenostephanus hondurensis*, are described as species new to science. Two genera and 12 previously described species are reported from Honduras for the first time. One new combination, *Stenostephanus sessilifolius*, based on *Glockeria sessilifolia* Oerst. [syn. *Hansteinia sessilifolia* (Oerst.) Durkee], and one new name, *Justicia ciriloi*, based on *Beloperone blechioides* Leonard [non *Justicia blechoides* (Lindau) Stearn], are proposed. A lectotype is designated for *Ruellia molinae* Gibson, a synonym of *Ruellia fulgida* Andr. Seven names currently applied to Honduran taxa are placed in synonymy of other names. Honduras has relatively low numbers of both total native species and endemic species of Acanthaceae compared to several smaller political units in the Mesoamerican region. This is attributed to several factors, including the prevalence of pine forests there. For each native species the catalog includes distributional data (both within and external to Honduras), habitats in Honduras, periods of flowering and fruiting in Honduras, specimen citations for each Honduran department in which the species is known to occur, and descriptions and/or taxonomic discussions where appropriate.

## INTRODUCTION

Located in the center of the Mesoamerican region, Honduras is the second largest Central American nation. Physiographically, it consists of a large mountainous core bounded by narrow Caribbean lowlands in the north and a small Pacific lowland in the south. The entire region has long been settled by pre-Colombian and subsequently European cultures, and much of the land area comprises second-growth forests. There is no recent treatment of the Honduran vascular flora, but estimates of the number of species there vary from 5000 (Gentry 1978) to 6000 (Gómez et al. 1997). Brief summaries of botanical activities in Honduras were provided by Nelson (1990, 1996) and Nelson et al. (1996). The country is divided politically into 18 departments (Fig. 1).

With the publication of the *Flora de Nicaragua* (Stevens et al. 2001), Honduras is the only nation in Central America for which a recent account of Acanthaceae is lacking. Other than descriptions of undescribed taxa and reports of range extensions, little has been published about this large, mostly tropical family in Honduras. The only previous account of Honduran Acanthaceae is that of Molina (1975), in which the names of 80 native and exotic (including cultivated) species of the family were listed. With the exceptions of the herbarium collections at EAP, F, and MO, Honduran Acanthaceae are not well represented in the world's major herbaria. For the family, Honduras is both the least known and least collected region in Mesoamerica. The following study was undertaken in order to document those Acanthaceae known from Honduras, to revise their nomenclature and taxonomy, assess the status of the family in Honduras relative to the other Central American nations, and to provide additional collections of Acanthaceae from the country. Herbarium collections in

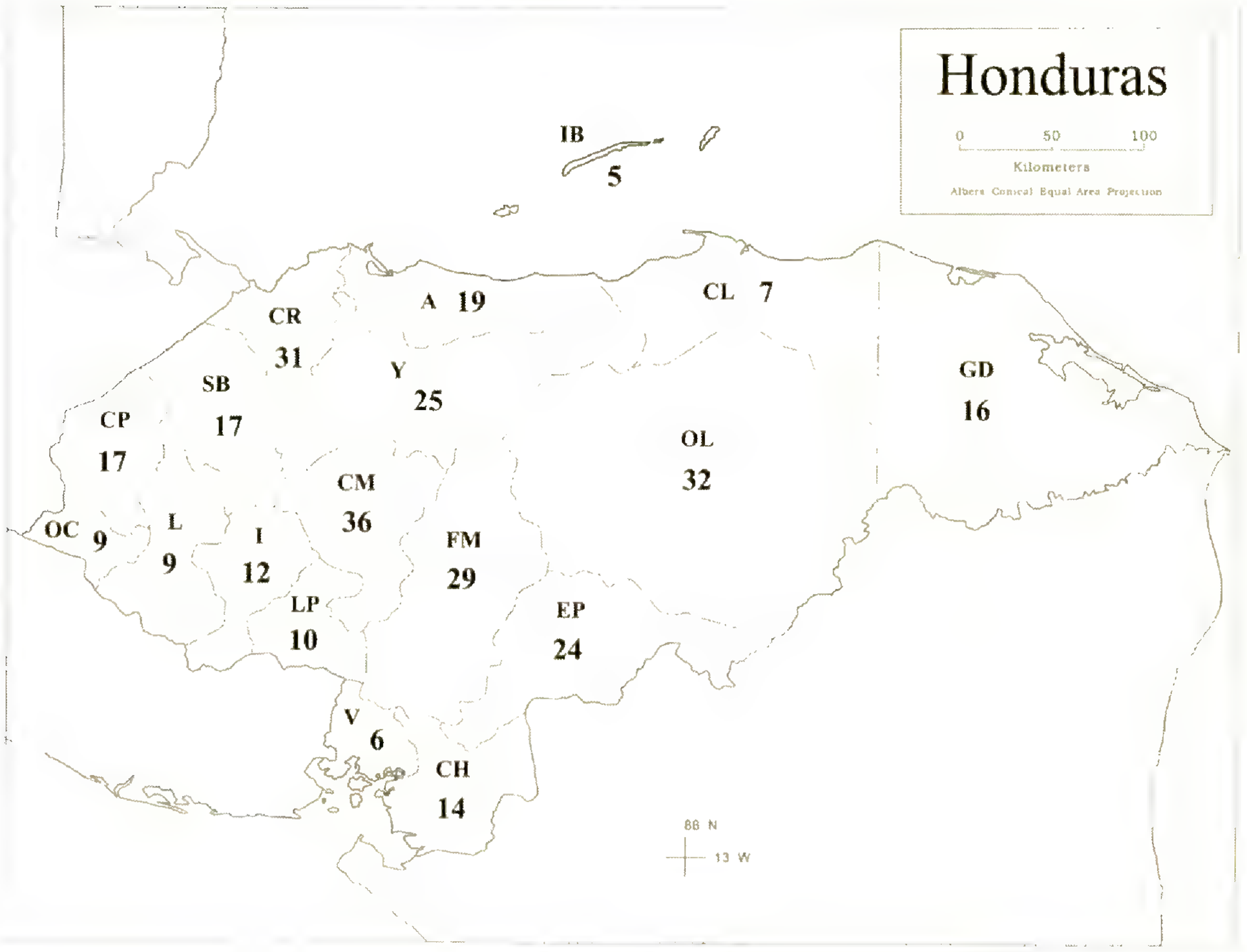


FIG. 1. Map of Honduras showing political departments and numbers of native species of Acanthaceae in each. A = Atlántida, CH = Choluteca, CL = Colón, CM = Comayagua, CP = Copán, CR = Cortés, EP= El Paraíso, FM = Francisco Morazán, GD = Gracias a Dios, I = Intibucá, IB = Islas de la Bahía, L = Lempira, LP = La Paz, OC = Ocotepeque, OL = Olancho, SB = Santa Bárbara, V = Valle, Y = Yoro.

Honduras, the United States, and Europe were studied, and field studies in 13 departments of Honduras were conducted for six weeks in 2000 and 2001.

## Summary of Acanthaceous Flora of Honduras

Herein, 96 species of Acanthaceae are documented from Honduras. Of these, 74 are treated as occurring natively there and 22 are native to other regions of the world and either cultivated and/or naturalized in the country. Four species, *Aphelandra molinae*, *Justicia pilzii*, *Pseuderanthemum liesneri*, and *Stenostephanus hondurensis*, are newly described from Honduras; two genera (*Herpetacanthus* and *Stenostephanus*) are newly reported from Honduras; and 12 previously described species of Acanthaceae (*Herpetacanthus panamensis*, *Justicia ciriloi*, *J. tuxtlensis*, *Mendoncia guatemalensis*, *M. lindavii*, *Odontonema cuspidatum*, *Pseuderanthemum verapazense*, *Ruellia metallica*, *R. standleyi*, *R. tuberosa*, *Stenandrium chameranthemoideum*, *Stenostephanus sessilifolius*) are reported as native to or naturalized in the country for the first time. Among genera of Honduran Acanthaceae, *Justicia* is the largest genus with 19 native species and *Ruellia* is the second largest with 11 native species. These are the two largest genera of Acanthaceae in the New World. The most widely distributed species in Honduras is *Aphelandra scabra*, which occurs in all 18 departments.

Eight species (*Aphelandra dunlapiana*, *A. molinae*, *Dicliptera antidysenterica*, *Justicia calliantha*, *J. pilzii*, *Lophostachys zunigae*, *Pseuderanthemum liesneri*, and *Stenostephanus hondurensis*) are recognized as endemic to the country. Three others (*Anisacanthus tetracaulis*, *Justicia ciriloi*, and *J. ensiflora*) are nearly endemic there (i.e., they occur only in Honduras and Belize, El Salvador, Guatemala, and/or Nicaragua).

Although neither the total number of native species of vascular plants nor the number of those endemic to Honduras are known, based on the estimates of Davis et al. (1986; i.e., 5000 species and 148 endemic species) about 3% of the species are endemic to the country. The percentage of endemic Acanthaceae (11%) is thus more than three and one half times greater than the overall rate of endemism for the country.

Taxonomic reassessments made during this study have resulted in a new name (*Justicia ciriloi* for *Beloperone blechioides*), a new combination (*Stenostephanus sessilifolius* for *Hansteinia sessilifolius*), the recognition of a species (*Dicliptera anti-dysenterica*) previously treated as conspecific with another, and the placing of seven currently accepted names (*Dyschoriste hondurensis*, *Justicia danielii*, *J. rothschuhii*, *Ruellia latibracteata*, *R. molinae*, *R. williamsii*, and *Siphonoglossa ramosa* var. *hondurensis*) in the synonymy of others.

The following account includes species that are known to occur in Honduras as documented by specimen vouchers. Based on their presence in adjacent regions of Central America, additional species of Acanthaceae might be expected to occur in Honduras, but have yet to be collected in the country. These include *Aphelandra gigantiflora* Lindau, *Chileranthemum pyramidatum* (Lindau) T. F. Daniel, *Dicliptera guttata* Standl. & Leonard, *Justicia caudata* A. Gray, *J. eburnea* D. N. Gibson, *J. fimbriata* (Nees) V. A. W. Graham, *J. grandiflora* D. N. Gibson, *J. montana* (Standl. & Leonard) D. N. Gibson, *J. silvicola* D. N. Gibson, *J. soliana* Standl., *Razisea spicata* Oerst., *Ruellia donnell-smithii* Leonard, *R. pereducta* Standl. ex Lundell, *R. pygmaea* Donn. Sm., *Schaueria parviflora* (Leonard) T. F. Daniel, and *Tetramerium tenuissimum* Rose.

## Distribution and Habitats

Wilson and Meyer (1982) presented a concise and informative account of Honduran physiographic, climatic, and ecological parameters in which they recognize nine ecological formations varying from arid to dry to moist to wet. American Acanthaceae occur in diverse communities but are particularly abundant in wet and dry lowland formations and in moist to wet montane forests. The habitat information provided in this treatment reflects that noted on herbarium specimens, which is sometimes imprecise or incomplete. From the pooled ecological data for a given species, it is often possible to determine whether it occurs in moist to wet vs. dry habitats, however. Among native Honduran Acanthaceae that can be unambiguously assigned to either moist to wet or dry formations, 46 species appear restricted to the former and only three (*Henrya insularis*, *Tetramerium nemorum*, and *T. nervosum*) to the latter. Few tropical American Acanthaceae occur in pine forests (including oak-pine forests), which are the most common and widespread plant communities in Honduras. Only 10 species of native Honduran Acanthaceae have been specifically noted to have been collected in such forests.

Figure 1 shows the numbers of native species of Acanthaceae in each department of Honduras. Major concentrations of species are present in the three central, mountainous departments of Comayagua (36), Olancho (32), and Cortés (31). Each of these departments contains a diversity of habitats, including extensive areas of both moist to wet and dry formations (Wilson & Meyer 1982). Olancho is the largest department of Honduras and, according to Nelson (1989), Comayagua is one of the few relatively well-collected departments. Departments with the fewest native Acanthaceae are Islas de la Bahía (5) and Valle (6). The low numbers there are likely

due to the small sizes of these departments, the lack of habitat diversity (each department consists mostly or entirely of a single ecological formation), and the high level of human disturbance in the landscape (i.e., Valle). Although the Bay Islands were apparently connected to the mainland throughout much of the Tertiary (Wilson & Meyer 1982), other small Caribbean islands near the Central American mainland are also poor in Acanthaceae (e.g., Fosberg et al. 1982).

Given the country's central location and diverse communities, it is perhaps not surprising that numerous Acanthaceae attain the northern- or southernmost extent of their distributions in Honduras. Non-endemic native Acanthaceae that attain the northernmost extent of their continental distributions in Honduras consist of *Herpetacanthus panamensis*, *Ruellia fulgida*, and *Stenostephanus sessilifolius*. All are species of moist to wet formations. Fifteen species of non-endemic Acanthaceae reach the southern- or easternmost extent of their continental distributions in Honduras: *Anisacanthus tetracaulis*, *Justicia breviflora*, *J. ciriloi*, *J. ensiflora*, *J. tuxtlensis*, *Louteridium donnell-smithii*, *Mendoncia guatemalensis*, *Odontonema albiflorum*, *O. cuspidatum*, *O. hondurense*, *Pseuderanthemum verapazense*, *Ruellia harveyana*, *R. puberula*, *Spathacanthus hahnianus*, and *Stenandrium chameranthemoideum*. Most of these species also occur predominantly or exclusively in moist to wet formations. It is a mystery to me why five times more northerly-occurring species reach the southern (or eastern) limit of their distributional range in Honduras than southern species reaching their northern limit.

## Phenology

In general for Honduras, wet and dry periods are correlated with wind patterns resulting from migrations of the thermal equator and intertropical convergence zone (Wilson & Meyer 1982); however, given the diverse topography, local weather patterns are sometimes greatly influenced by regional physiography. In general, rains normally commence in Honduras in April or May, followed by a short dry season (the so-called "veranillo") in late July and early August. Another period of rain commences following the veranillo and lasts until November or December. This is followed by the main dry season of five to six months duration. At least five species of native Honduran Acanthaceae flower more or less throughout the year: *Aphelandra aurantiaca*, *A. scabra*, *Justicia ramosa*, *Odontonema tubaeforme*, and *Ruellia hookeriana*. The vast majority (at least 57 species) of the remaining native Honduran Acanthaceae flower during the long dry season from December into April or May. Forty-one of these species appear to flower only during that season. The known flowering periods of eight species (*Herpetacanthus panamensis*, *Justicia ensiflora*, *Mendoncia retusa*, *Pseuderanthemum alatum*, *P. cuspidatum*, *Ruellia puberula*, *Spathacanthus hahnianus*, and *Stenandrium pedunculatum*) suggest that they flower primarily or exclusively during the rainy season(s). Several of these species are known from relatively few collections and additional observations would be helpful to confirm their flowering periods. Flowering collections (i.e., with corollas present) of *Lophostachys zunigae* and *Ruellia standleyi* from Honduras remain unknown. Fruiting usually occurs simultaneously with flowering or lags only a month or two behind.

## Honduran Acanthaceae in a Regional Context

For its relative size, location in the tropics, and topographic complexity, Honduras seems depauperate in the total number of native species of Acanthaceae. Table 1 shows a comparison of Acanthaceae in Central American nations as well as in

## TABLE 1. FLORISTIC DATA FOR REGIONS OF NORTHERN LATIN AMERICA

The Yucatan Peninsula of Mexico comprises the states of Campeche, Quintana Roo, and Yucatán. Sources for numbers of total vascular plant species are: Mexico (J.-L. Villaseñor, pers. comm.), Yucatan Peninsula (G. Carnevali, pers. comm.), Chiapas (Breedlove 1981), Belize (Balick et al. 2000), Guatemala (Breedlove 1981), El Salvador (Gómez et al. 1997), Honduras (Gómez et al. 1997), Nicaragua (Stevens et al. 2001; G. Davidse, pers. comm.), Costa Rica (Hammel, pers. comm.), Panama (D'Arcy 1987), Colombia (E. Forrero, pers. comm). Sources of data for native Acanthaceae are: Mexico (Daniel, unpublished), Yucatan Peninsula (Daniel, unpublished), Chiapas (Daniel 1995, 1999a, 1999c), Belize (Daniel 1997), Guatemala (Daniel 2001 and unpublished), El Salvador (Daniel 2001), Honduras (present study), Nicaragua (Daniel 2001), Costa Rica (Daniel 2001), Panama (Daniel 2001), and Colombia (Daniel, unpublished); numbers for endemic Acanthaceae are derived from these same sources and from additional unpublished information.

| Region | Area ($km^2$) | Total number of vascular plant species | Native species of Acanthaceae | Endemic species of Acanthaceae | Percent endemism |
|---|---|---|---|---|---|
| Mexico | 1,972,546 | ~23,500 | 380 | 233 | 61% |
| Yucatan Peninsula | 141,525 | ~2,150 | 40 | 10 | 25% |
| Chiapas | 73,887 | 8,248 | 125 | 16 | 13% |
| Belize | 22,965 | 3,408 | 40 | 1 | 3% |
| Guatemala | 108,889 | 7,749 | 120 | 13 | 11% |
| El Salvador | 20,877 | ~2,500 | 43 | 0 | 0% |
| Honduras | 112,088 | ~6,000 | 74 | 8 | 11% |
| Nicaragua | 140,746 | 5,354 | 59 | 2 | 3% |
| Costa Rica | 51,101 | 9,360 | 121 | 38 | 31% |
| Panama | 77,060 | ~8,145 | 108 | 21 | 19% |
| Colombia | 1,138,914 | ~35,000 | 336 | 246 | 73% |

Mexico and Colombia to the immediate north and south. Given its relatively large size and habitat diversity, Honduras has fewer total species and endemic species of Acanthaceae than several smaller regions to the north and south. This same situation is evident to an even greater extent in Nicaragua, the largest Central American nation, which has only 59 total native species and just two endemic species of Acanthaceae.

One can attribute the relatively small numbers of Acanthaceae in Belize and El Salvador to such factors as the relatively small sizes of these nations, the disturbance there caused by humans (both pre- and post-Columbian), and the lack of a diversity of major vegetation types. But what accounts for the small numbers in Honduras and Nicaragua? Both are large and have a greater diversity of vegetation types. Assuming that both countries are as well collected as Costa Rica, Panama, and Guatemala, there are several possible reasons for the relative paucity of Honduran (and presumably Nicaraguan) Acanthaceae compared with surrounding regions:

1) There are not as many regions at high elevations in Honduras as there are in Guatemala, Costa Rica, and Panama. The highest point in Honduras (Montaña Celaque at 2850 m) is considerably lower than the higher mountains in these countries (each of which has several peaks above 3000 m). Although Acanthaceae are not abundant in the cloud forest habitats that are generally found at these elevations, several genera (e.g., *Spathacanthus*, *Stenostephanus*) and species in other genera

(e.g., *Aphelandra tonduzii* Leonard, *Dicliptera iopus* Lindau, *D. skutchii* Leonard, *Justicia angustibracteata* Leonard, *J. fortunensis* T. F. Daniel & Wassh.) are mostly or entirely confined to such locations.

2) There is a general absence of climatic extremes, both wet and dry, in Honduras compared with several other Mesoamerican regions. The more or less continuous dry forest or thornscrub that extends from Mexico to Costa Rica along the Pacific Coast occupies very little area in Honduras due to the country's topography. As in several of the other regions of the country supporting dry forest and thornscrub, the limited dry region of the Pacific lowlands in southern Honduras has been highly degraded through its long history of human occupation and continues to be severely impacted by overgrazing of livestock and agriculture. There is also little truly wet forest in Honduras. Most portions of the low to mid-elevation, moist to wet forests of the Caribbean versant in Honduras have a definite dry season that decreases their diversity compared to the wet montane forests of other regions of Central America. Even moist to wet regions at high elevations that are referred to as cloud forests in Honduras (and which indeed contain cloud forest elements) have a definite dry season and are not nearly as rich in species as cloud forests to the north or south.

3) The presence of pine forests covering much of the country would appear to be a limiting factor for many species of Acanthaceae, as noted above. Pine forests are notably lacking in Acanthaceae wherever both occur, from the southeastern United States through Mexico and northern Central America to Nicaragua, where this forest type reaches its southern extent. Hence, the lack of Acanthaceae in this plant community and its prevalence in Honduras likely help to explain the relatively low number of acanthaceous species in the country.

It is probable that there is no single reason for the low numbers of both species and endemic taxa in Honduras (and Nicaragua) compared to smaller political units in the Mesoamerican region. Those numbers may result from all of the factors mentioned and from additional factors that are not obvious to me. Based on the numbers of total species presented in Table 1 and figures cited by Bramwell (2002), it appears that taxa other than Acanthaceae show a similar pattern in this region. Indeed, Almeda (1996) noted a similar situation for Honduran Melastomataceae.

## Conservation and Future Studies

Even with a lower number of acanthaceous species in Honduras compared with some other Mesoamerican regions, the country is home to a diverse, unique, and interesting assemblage of Acanthaceae. Indeed, the percentage of Acanthaceae endemic to Honduras (Table 1) is similar to that of Guatemala and Chiapas, regions with considerably more species. Several undescribed species are described below and additional taxa will undoubtedly be discovered in Honduras as remote regions are explored. Fortunately, several of the endemic Acanthaceae occur in protected reserves (e.g., *Aphelandra molinae* in Parque Nacional de Celaque and *Lophostachys zunigae* in Parque Nacional Pico Bonito). It is difficult to assess the conservation status of the majority of acanthaceous species in Honduras. Some formerly common species may be seriously threatened by loss of habitat (e.g., *Anisacanthus tetracaulis*, see below), whereas other species appear to be quite rare and are not known to occur in protected areas (e.g., *Aphelandra dunlapiana*). Hopefully, the information presented in the catalog below can help to assess the conservation priorities and needs for this family in Honduras.

Collections representing three species of Honduran Acanthaceae, two of *Justicia* and one of *Dicliptera*, could not be identified; they do not sufficiently resemble known species in their respective genera from North and Central America to be associated with a name. In this catalog, they are treated under their respective genera but will require additional studies to determine whether they represent undescribed species, fall within the circumscription of poorly known South American taxa, or represent variation within species that require taxonomic reconsideration.

La Mosquitia (i.e., that part of northeastern Honduras mainly occupied by the indigenous Miskito people, with extensive areas of lowland pine savanna, and comprising most of the department of Gracias a Dios) is perhaps the least explored and least collected region of Honduras (Proctor 1983). Undoubtedly, additional native Acanthaceae will be found there. It is also likely that there were additional Acanthaceae in Honduras that have been extirpated during the past several hundred years.

## Contents of Catalog

In the following enumeration of Honduran Acanthaceae at least one collection is cited from each department in which the species is known to occur. For native and naturalized species the habitats, elevational ranges, and flowering and fruiting times noted are based solely on Honduran collections. Distributions in the Western Hemisphere are noted for each native species. Detailed descriptions are provided here only for poorly known species and Honduran endemics. Pollen morphology is often useful for both classifying and identifying Acanthaceae. Scanning electron micrographs of pollen grains are shown for rare and endemic species, or to illustrate characteristics used in taxonomic discussions. Keys to and descriptions of most Acanthaceae occurring in Honduras are available in one or more of the following recent treatments of American Acanthaceae: Daniel (1995b), Durkee (1978, 1986, 2001), and Gibson (1974). The catalog also includes Acanthaceae cultivated in Honduras as they are represented in herbaria. In addition to those noted here, there are undoubtedly other exotic Acanthaceae cultivated in the country. Types of all names based on Honduran Acanthaceae are noted. Taxonomic reconsiderations are discussed where appropriate.

## CATALOG OF HONDURAN ACANTHACEAE

**Acanthus montanus** (Nees) T. Anders.

This native of western tropical Africa is cultivated in gardens in Honduras. Other species of *Acanthus* L. are likely grown for ornament in the country as well. Nelson (1986) noted *A. mollis* L. as being cultivated there, but no specimens of it have been located.

Representative Specimen. **Comayagua**: vicinity of Siguatepeque, planted in garden, *P. Standley & J. Chacón P. 6627* (F).

**Anisacanthus tetracaulis** Leonard

Shrubs to 2 (–3) m tall. Young stems quadrate to quadrate-sulcate, ± bifariously to ± evenly pubescent with retrorse to flexuose to antrorse eglandular trichomes 0.1–1 mm long, distally often with an understory of evenly disposed eglandular to subglandular and glandular trichomes less than 0.05 mm long as well. Leaves petiolate,

petioles to 44 mm long, blades ovate to ovate-elliptic, 25–120 mm long, 10–77 mm wide, 1.5–3.3 times longer than wide, acuminate at apex, truncate to rounded to acute at base, surfaces pubescent (especially along major veins) with flexuose to antrorse eglandular trichomes, the abaxial surface also pubescent with an understory of erect glandular trichomes to 0.1 mm long (sometimes restricted to midvein). Inflorescence of axillary and terminal dichasiate spikes (to racemes to thyrses), these sometimes branched at base and collectively forming a terminal panicle, rachises evenly pubescent with erect eglandular to subglandular and glandular trichomes to 0.1 mm long, and usually also with a sparse overstory of eglandular trichomes like those of young stems (especially proximally); dichasia alternate, 1 per axil, secund, sessile to subsessile (i.e., with peduncles to 1 mm long). Bracts subulate, 1.5–2.5 mm long, 0.2–0.5 mm wide, abaxial surface pubescent with antrorse eglandular trichomes 0.2–0.5 mm long. Bracteoles subulate, 1.5–2.5 mm long, 0.3–0.4 mm wide, abaxial surface pubescent like bracts and with understory trichomes like those of rachis as well. Flowers sessile to pedicellate, pedicels to 3 mm long. Calyx 6–9 mm long (during anthesis, up to 11 mm long in fruit), tube 1–1.5 mm long, lobes lance-subulate, 4.5–8 mm long, 3.8–8 times longer than tube, 0.8–1.6 mm wide, abaxially pubescent with an understory of erect glandular and eglandular trichomes 0.05–0.2 mm long and an overstory (sometimes absent) of flexuose to antrorse eglandular trichomes to 0.6 mm long. Corolla red, 22–28 mm long, externally pubescent with flexuose to retrorse eglandular trichomes 0.1–0.3 mm long, tube 13–15 mm long, upper lip 11–15 mm long, 2-lobed at apex, lobes to 0.8 mm long, lower lip 11–14 mm long, lobes ovate, 3.5–6.5 mm long, 2.5–4 mm wide. Stamens 21–37 mm long, thecae red, 2.5–3.3 mm long; pollen (Fig. 2a, b) 3-colporate, 6-pseudocolpate, interapertural surfaces reticulate. Style 23–38 mm long, stigma 0.3 mm long, lobes not evident. Capsule 11–16 mm long, glabrous, head subspherical to somewhat flattened, ovate to elliptic in outline, 6–9 mm long. Seeds 2–4 per capsule, sublenticular to concavo-convex, 4.5–5.8 mm long, 3.5–4.6 mm wide, surfaces and margin tuberculate.

Phenology. Flowering: November–May; fruiting: February–May.

Distribution and habitat. El Salvador, Honduras; open fields in region of moist forest, moist thickets, along streams, dry forests, dry brushy quebradas, roadsides; 800–1200 m.

Representative Specimens. Comayagua: Taulabé, quebrada La Caliche, *A. Rubio 7* (MO, PMA).—El Paraíso: Río de los Aguacates N of Yuscarán, *P. Standley 25718* (EAP).—Francisco Morazán: Río de La Orilla, SW del Valle de Yeguare, *A. Molina R. 3928* (EAP, F, GH). –Olancho: Campamento, *R. Ramos 131* (MO).

Only a single collection of this species is known from outside of Honduras (Daniel 2001). The type [Francisco Morazán: region of Cahuite, 800–1075 m, dry brushy quebrada, 5 March 1947, *P. Standley et al. 5012* (holotype: US!; isotypes: F! NY!)] and most other collections are from the department of Francisco Morazán. Two species of *Anisacanthus* (ca. 20 species, mostly from North America and South America) are known from Central America, this one and the recently described *A. nicaraguensis* Durkee from Nicaragua (Durkee 1999). According to Durkee (1999), *A. tetracaulis* differs from *A. nicaraguensis* by its shorter corollas (22–27 vs. 33–35 mm long), shorter calyces (6–9 vs. 11–15 mm long), shorter bracts and bracteoles (1.7–2.5 vs. 3.5–4.5 mm long), and shorter thecae (2.5–3.3 vs. 3.6–3.8 mm long). Leonard (1950) indicated that *A. tetracaulis* is related to the South American species, *A. caducifolius* (Griseb.) Lindau, which he indicated differed by its terete stems, shorter inflorescence, and smaller calyces. Daniel (2001) noted some of the distinctive characters of

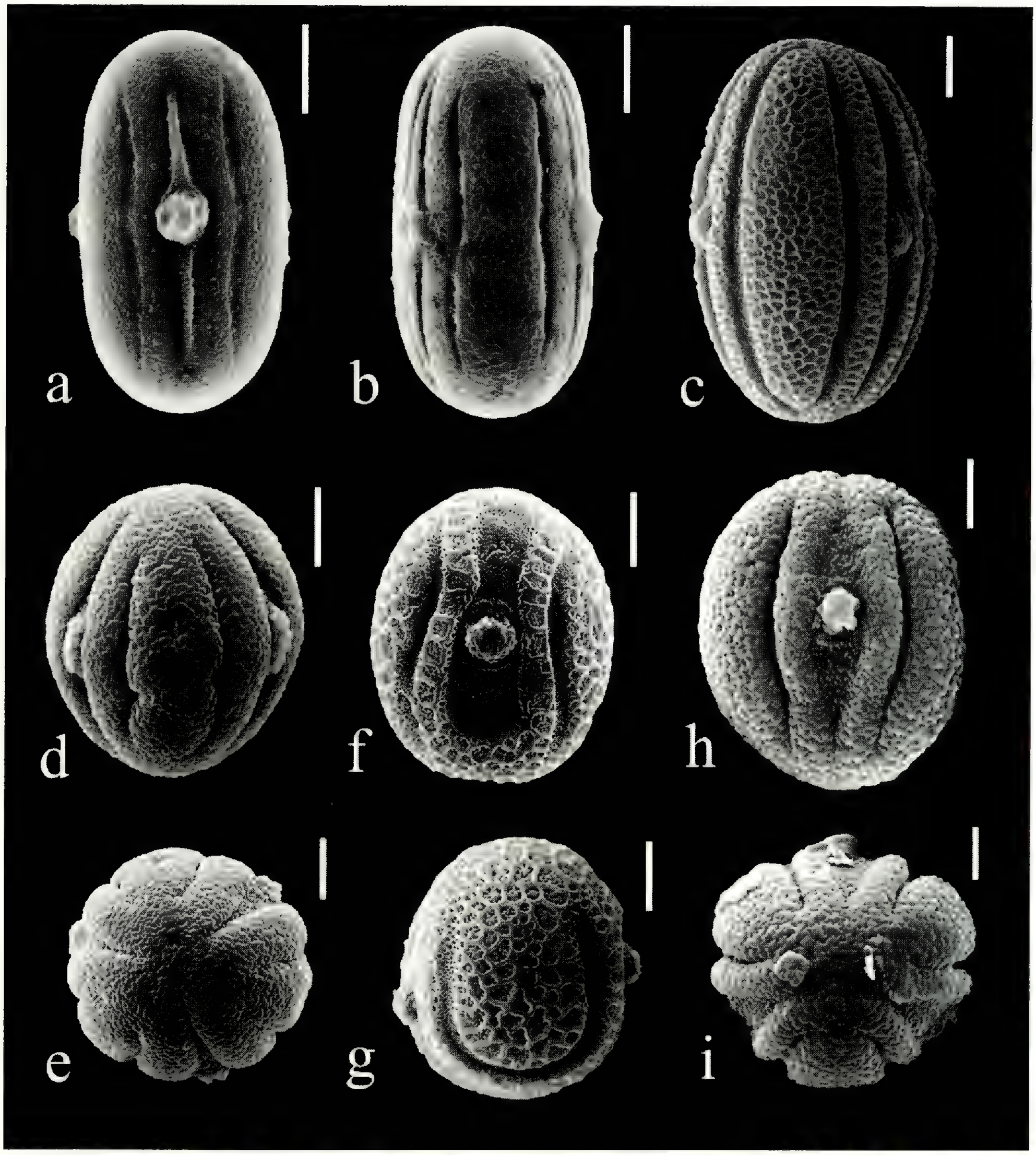


FIG. 2. Pollen of Honduran Acanthaceae. a. *Anisacanthus tetracaulis* (*Tucker 629* from El Salvador), apertural view. b. *A. tetracaulis* (*Tucker 629*), interapertural view. c. *Dicliptera* sp. (*Molina et al. 31415*), interapertural view. d. *Odontonema hondurense* (*Daniel & Araque 9500*), interapertural view. e. *O. hondurense* (*Daniel & Araque 9500*), polar view. f. *Dicliptera antidysenterica* (*Daniel & Araque 9612*), apertural view. g. *D. antidysenterica* (*Daniel & Araque 9612*), interapertural view. h. *Pseuderanthemum liesneri* (*Liesner 26343*), apertural view. i. *P. liesneri* (*Liesner 26343*), polar view. Scale bar: a, b = 15 μm; c, e = 9 μm; d, f, g = 10 μm; h, i = 6 μm.

*A. tetracaulis* with respect to Salvadoran Acanthaceae, but a full description of this poorly known species seems warranted and is provided above.

It appears that *Anisacanthus tetracaulis* is becoming rare in Honduras. It was rather commonly collected in the vicinity of Tegucigalpa and in the Yeguare Valley until about 1950. It has been collected only rarely since that time, and I was unable to locate populations of it during 2000 and 2001 in spite of extensive searching in regions where it had previously been collected. Both regions have experienced considerable increases in human population and environmental alteration in the years since 1950.

**Aphelandra aurantiaca** Lindl.

Phenology. Flowering: throughout the year; fruiting: December, March–April, July.

Distribution and habitat. Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil; moist forests, wet forests; 30–360 m.

Representative Specimens. Atlántida: Lancetilla Valley, ca. 3 km up Río Lancetilla from Lancetilla Botanical Garden, ca. 15°44'N, 87°27'W, *T. Daniel & J. Araque 9483* (CAS, EAP, MO).—Cortés: La Cumbre desprendimiento de Sierra de Omoa, *A. Molina R. 3472* (EAP, F, US).—Islas de la Bahía: Guanaja, Fruit Harbour Bight, *W. Matamoros 187* (TEFH).—Yoro: Cordillera Nombre de Dios, ca. 2.5 km S of San José de Texíguat, between Río Guán Guán and Quebrada Aguacatal, 15°30'N, 87°27.5'W, *R. Evans 1316* (CAS, MO).

The narrow-leaved form of the species, sometimes treated as *A. repanda* Nees or *A. aurantiaca* var. *stenophylla* Standl., is known from northwestern Honduras (e.g., *Standley 52635* at EAP, *Standley 53875* at F). The type of the latter name is from this region: Atlántida: Lancetilla Valley near Tela, 150 m, wet forest, 22 December 1927, *Standley 53487* (holotype: F!).

**Aphelandra dunlapiana** Standl. & L. O. Williams

Perennial herbs or shrubs to 2 m tall. Young stems subquadrate to quadrate, evenly pubescent with erect to antrorse to antrorsely appressed eglandular trichomes 0.2–0.5 mm long. Leaves opposite, petiolate, petioles to 110 mm long, blades elliptic, 200–350 mm long, 66–138 mm wide, 2.3–4.0 times longer than wide, acuminate at apex, gradually or abruptly attenuate at base, surfaces pubescent (especially along major veins) with erect to flexuose to antrorse eglandular trichomes, margin entire to subsinuate. Spikes terminal, elongate, up to 180 mm long (excluding flowers), 40–49 mm in diameter (excluding flowers) near midspike, rachis evenly pubescent with erect to flexuose eglandular trichomes 0.3–0.6 mm long. Bracts tinged reddish when dry, spreading with age, ovate to elliptic to narrowly elliptic, 16–29 mm long, 4–10 mm wide, 2.9–4 times longer than wide, acute and erect at apex, abaxial surface and margin pubescent with flexuose to antrorse eglandular trichomes 0.2–0.4 mm long and distally pubescent with erect glandular trichomes 0.1–0.2 mm long as well, margin dentate with 1 (–2) teeth per side, teeth 0.2–3.5 (–4.5) mm long. Bracteoles often deciduous, subulate, 1.2–2.5 mm long, 0.2–0.4 mm wide, abaxial surface pubescent with antrorse eglandular trichomes 0.2–0.6 mm long. Calyx 9–14 mm long, lobes lanceolate to lance-ovate, 2–2.7 mm wide at base, subaristate to aristate at apex, abaxially pubescent with flexuose to antrorse eglandular trichomes 0.2–0.6 mm long. Corolla red, 60–67 mm long, externally pubescent with flexuose glandular (and a few eglandular) trichomes 0.3–1.2 mm long, upper lip 24–26 mm long, entire or 2-lobed at apex, lobes to 1 mm long, margin flared except at apex and base, lower lip ± perpendicular to or forming an obtuse angle with upper lip, 27–32 mm long, lateral lobes linear-elliptic, 22–24 mm long, 2.5–6 mm wide, lower-central lobe elliptic, 25–30 mm long, 7–12 mm wide, 1–1.3 times longer and 1.7–3.4 times wider than lateral lobes. Stamens 55–58 mm long, filaments pubescent with eglandular trichomes throughout length, thecae 6.5–7.5 mm long, apically pubescent with cobwebby trichomes, posterior pair extended up to 1.5 mm beyond anterior pair; pollen (Fig. 3a–c) 3-colpate; staminode not seen. Style 54–60 mm long, pubescent throughout length, stigma symmetrically funnelform, 0.2–0.3 mm long. Capsule 17–19 mm long, glabrous. Seeds ± flattened,

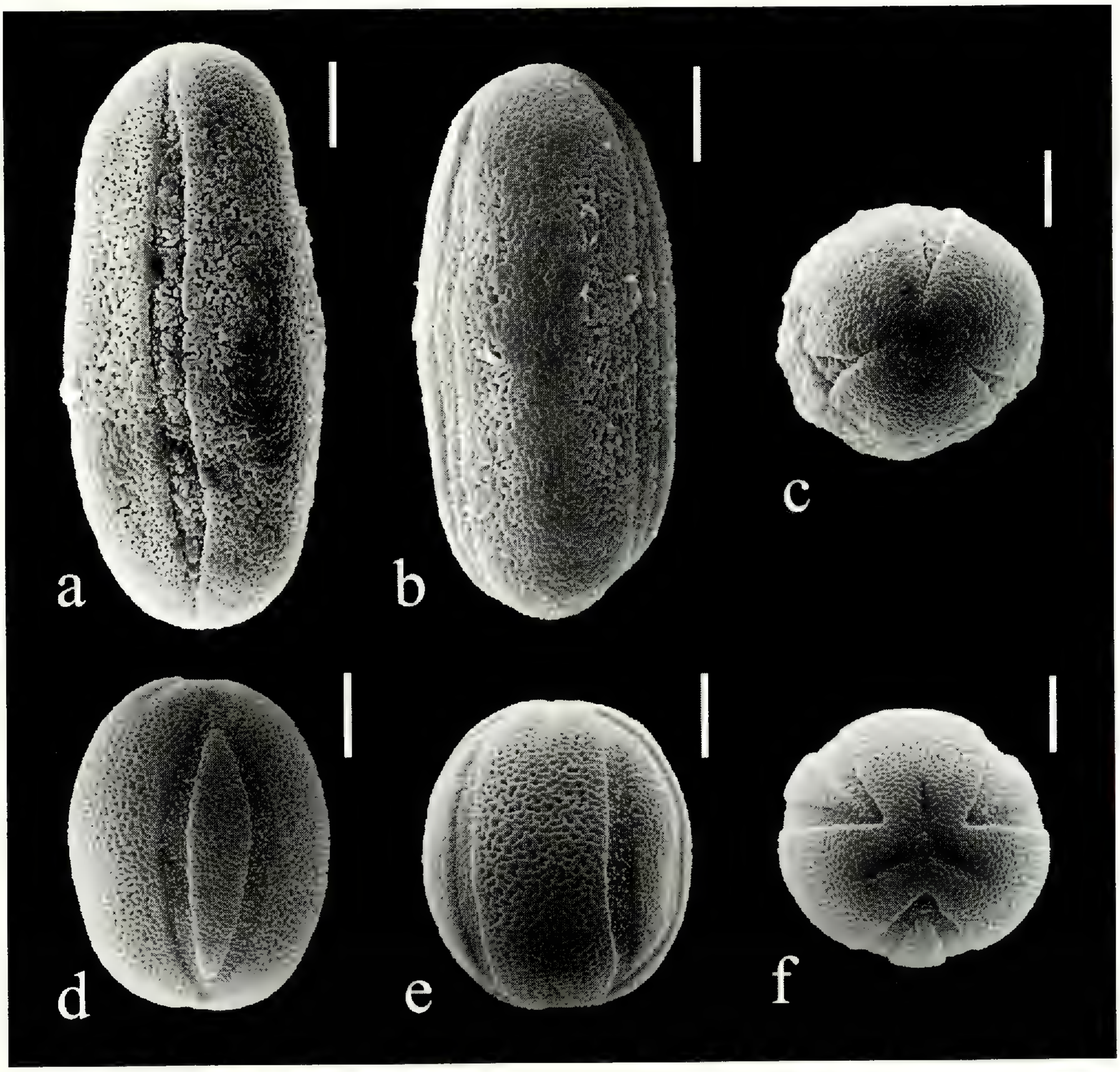


FIG. 3. Pollen of *Aphelandra dunlapiana* (*Hazlett et al. 8022*) and *A. molinae* (*Daniel & Araque 9885*). a. *A. dunlapiana*, apertural view. b. *A. dunlapiana*, interapertural view. c. *A. dunlapiana*, polar view. d. *A. molinae*, apertural view. e. *A. molinae*, interapertural view. f. *A. molinae*, polar view. Scale bar: a, b, f = 9 µm; c = 8 µm; d, e = 10 µm.

5–5.5 mm long, 4–4.5 mm wide, surface covered with unbranched papilla-like trichomes to 0.2 mm long.

Phenology. Flowering: April; fruiting: April.

Distribution and habitat. Endemic to Honduras; moist to wet forests; 150–270 m.

Representative Specimens. Atlántida: ravines E of Texíguat River, 1–2 km SW of aldea La Aurora, 15°30'N, 87°26'W, *D. Hazlett et al. 8022* (CAS, EAP).—Yoro: Cuenca de la Quebrada El Aguacatal, al S de San José de Texíguat, 15°30'16"N, 87°27"27"W, *J. González 704* (CAS, MO).

The specimens cited above represent the first collections of this species since the type [Atlántida: vicinity of San Alejo, at base of hills S of San Alejo near Río San Alejo, 22–27 April 1947, *P. Standley 7618* (holotype: F!; isotype: US!)] was collected in 1947. They reveal that this species, endemic to Honduras and with particularly showy flowers, persists in the Caribbean lowlands of the northwestern part of the country. The description of *A. dunlapiana* given above is based on all known collections.

**Aphelandra molinae** T. F. Daniel, sp. nov.—TYPE: HONDURAS. Lempira: Parque Nacional de Celaque, ca. 7 km W of Gracias, summit trail from visitor center to Las Minas, 14°33–34'N, 88°38–40'W, 1500 m, moist montane forest, 16–17 January 2001, *T. Daniel & J. Araque 9885* (holotype: CAS!; isotypes: EAP! MICH! MO! TEFH!). Fig. 4.

Frutex usque ad 1.5 m altus. Folia opposita, laminae ellipticae, 110–205 mm longae, 28–59 mm latae, 3.5–4.0-plo longiores quam latiores. Spicae ± elongatae, 40–55 mm diametro ad medium. Bracteae ovatae vel ellipticae vel obovatae, 28–40 mm longae, 12–15 mm latae, margine integrae, pagina abaxialis pubescens trichomatibus glandulosis et eglandulosis. Bracteolae lanceolatae, 15–18 mm longae. Corolla rubra, 67–70 mm longa, extus pubescens, labium inferum lobis lateralibus obovatis, 16–18 mm longis, 8.5–11 mm latis. Thecae 6–6.2 mm longae, pubescentes. Capsula pubescens trichomatibus eglandulosis.

Shrubs to 1.5 m tall. Young stems subterete to quadrate-sulcate, sparsely pubescent with antrorsely appressed eglandular trichomes 0.1–0.3 mm long. Leaves opposite, petiolate, petioles (naked portion) to 65 mm long, blades elliptic, 110–205 mm long, 28–59 mm wide, 3.5–4.0 times longer than wide, acuminate to falcate at apex, attenuate-decurrent at base, surfaces ± sparsely pubescent (especially along major veins) with antrorsely appressed eglandular trichomes, margin entire. Spikes terminal, ± elongate, up to 90 mm long (excluding flowers), 40–55 mm in diameter (excluding flowers) near midspike, rachis evenly and ± densely pubescent with erect to flexuose eglandular and glandular trichomes 0.3–0.7 mm long. Bracts maroon-tinged, ovate to elliptic to obovate, 28–40 mm long, 12–15 mm wide, 2.2–2.8 times longer than wide, erect to spreading, ± abruptly acuminate to subcaudate and erect to recurved-spreading at apex, abaxial surface and margin pubescent with erect to flexuose eglandular and glandular trichomes 0.1–0.6 mm long (glandular pubescent), margin entire. Bracteoles lanceolate, 15–18 mm long, 1.7–2.6 mm wide, abaxial surface glandular pubescent. Calyx 16–18 mm long, lobes free to base, lanceolate, 2.5–3 mm wide at base, abaxially glandular pubescent. Corolla red, 67–70 mm long, externally glandular pubescent, upper lip 24–26 mm long, emarginate at apex, lower lip perpendicular to upper lip to reflexed, 26–28 mm long, lateral lobes obovate, 16–18 mm long, 8.5–11 mm wide, lower-central lobe obovate, 25–27 mm long, 17–22 mm wide, 1.5–1.6 times longer and 1.8–2.1 times wider than lateral lobes. Stamens 49–55 mm long, posterior pair inserted 1 mm distal to anterior pair, filaments proximally pubescent with flexuose eglandular trichomes, distally sparsely pubescent to glabrous, thecae 6–6.2 mm long, all apically pubescent, posterior pair dorsally pubescent as well, anterior pair dorsally sparsely (if at all) pubescent; pollen (Fig. 3d–f) 3-colpate, each colpus with a fusiform band of thickened exine in the center, each pole with 3-armed aperturelike indentation; staminode 1 mm long. Style 60–63 mm long, pubescent with eglandular trichomes throughout, stigma 0.2–0.5 mm long, ± symmetrically funnelform. Capsule 17–23 mm long, pubescent with erect to flexuose to antrorse to retrorse eglandular trichomes 0.2–0.3 mm long. Seeds not seen.

Phenology. Flowering: January; fruiting: January.

Distribution and habitat. Endemic to western Honduras; moist montane forests; 1500 m.

This showy species is similar to *Aphelandra gigantiflora* Lindau in most features; however, it differs sufficiently from that taxon to warrant taxonomic recognition. These two species can be distinguished by the following couplet:

FIG. 4. *Aphelandra molinae* (*Daniel & Araque 9885*). a. Habit with flowers, ×0.6. b. Apex of stamen with anther, ×8. c. Distal portion of style with stigma, ×10.6. d. Capsule with calyx and one bracteole, ×2.4. e. Apex of bracteole showing pubescence, ×3.5. Drawn by Paul Hayes.

Bracts ± abruptly acuminate to subcaudate at apex; bracteoles 1.7–2.6 mm wide; lower lip of corolla with lateral lobes obovate, 8.5–11 mm wide, lower-central lobe 17–22 mm wide, 1.8–2.1 times wider than lateral lobes; thecae 6–6.2 mm long; Honduras. *A. molinae*

Bracts (rounded to) acute to gradually acuminate at apex; bracteoles 0.6–1.5 mm wide; lower lip of corolla with lateral lobes lance-linear to linear to linear-elliptic, 1–5.5 mm wide, lower-central lobe 8–17 mm wide, 3.1–8.6 times wider than lateral lobes; thecae 3.5–5.3 mm long; southern Mexico, Guatemala, and El Salvador. *A. gigantiflora*

The following key can be used to distinguish among the native species of *Aphelandra* now known from Honduras.

1. Abaxial surface of bracts with 2 submarginal clusters of padlike nectaries (up to 16 per cluster); corolla 30–45 mm long, lateral lobes of lower lip reduced to vestigial toothlike appendages up to 2.5 mm long and attached to upper lip. *A. scabra*
1. Abaxial surface of bracts without clusters of padlike nectaries; corolla 50–70 mm long, lateral lobes of lower lip conspicuous, 9.5–24 mm long, not attached to upper lip.
   2. Young stems ± flattened; bracts dentate with 7–15 teeth per side; lateral lobes of lower lip of corolla 9.5–15 mm long; thecae 4–5 mm long. *A. aurantiaca*
   2. Young stems subterete to quadrate to quadrate-sulcate; bracts entire or dentate with 1 (–2) teeth per side; lateral lobes of lower lip of corolla 16–24 mm long; thecae 6–7.5 mm long.
      3. Inflorescence rachis pubescent with eglandular trichomes only; bracts 16–29 mm long, 4–10 mm wide, 2.9–4 times longer than wide, acute at apex, margin dentate with 1 (–2) teeth per side; bracteoles subulate, 1.2–2.5 mm long; lateral lobes of lower lip of corolla linear-elliptic, 22–24 mm long, 2.5–6 mm wide; capsule glabrous. *A. dunlapiana*
      3. Inflorescence rachis pubescent with eglandular and glandular trichomes; bracts 28–40 mm long, 12–15 mm wide, 2.2–2.8 times longer than wide, ± abruptly acuminate to subcaudate at apex, margin entire; bracteoles lanceolate, 15–18 mm long; lateral lobes of lower lip of corolla obovate, 16–18 mm long, 8.5–11 mm wide; capsule pubescent. *A. molinae*

It is a pleasure to name this striking species in honor of Don Antonio Molina R. (b. 1926), long-time taxonomist with the Escuela Panamericana Agrícola, able collector of American plants, and dedicated proponent of Central American botany (Malo 1999).

**Aphelandra scabra** (Vahl) Sm.

Phenology. Flowering: September–April, July; fruiting: January–May.

Distribution and habitat. Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana, Surinam, Brazil; moist forests, pine forests, pine-oak forests, oak forests, thickets, along streams, brushy slopes; 0–1900 m.

Representative Specimens. Atlántida: Puerto Escondido, Punta Sal, 25 km O de Tela, *C. Nelson 7860* (TEFH).—Choluteca: near Bella Vista, *L. Williams & A. Molina R. 10897* (EAP).—Colón: base of Cerro Piedra Blanca, ca. 5 km NE of Bonito Oriental toward Limón, 15°46.5'N, 85°41'W, *R. Evans 1074* (CAS).—Comayagua: Siguatepeque, *J. Edwards 486* (UC, US).—Copán: 4 km N Copán Ruinas, *D. Lentz 1744* (EAP).—Cortés: Río Ulúa, Pimienta, *A. Molina R. 5626* (EAP, F).—El Paraíso: road to Yuscarán, Quebrado del Muro, *J. Swallen 11335* (NY, US).—Francisco Morazán: Río Yeguare near San Francisco, ca. 5 km S of El Zamorano, ca. 13°58'N, 86°59'W, *T. Daniel & J. Araque 9444* (CAS, EAP, MO).—Gracias a Dios: Barra Plátano, 15°53'N, 84°42'W, *P. Fryxell 2834* (CAS).—Intibucá: Quebrada Santiago near SW base of Sierra de Montecillos, ca. 24.5 km SW of Siguatepeque toward Jesús de Otoro, ca. 14°31'N, 87°59'W, *T. Daniel & J. Araque 9642a* (CAS, EAP). –Islas de la Bahía: Isla de Roatán, *C. Nelson & E. Romero 4584* (CAS).—La Paz: 300 m S de Guajiquiro, *R. Keyser 1384* (EAP).—Lempira: Celaque National Park, ca. 7 km W of Gracias, ca. 14°34'N, 88°38'W, *T. Daniel & J. Araque 9626* (CAS, EAP).—Ocotepeque: vicinity of Nuevo Ocotepeque, *P. Standley 27898* (EAP).—Olancho: lower slopes of Sierra de Agalta, 3–5 km above (N) of Catacamas, ca. 14°53'N, 85°54'W, *T. Daniel & G. Pilz 9598* (CAS, EAP).—Santa Bárbara: Lago Yojoa, Punta Gorda, 14°52'N, 88°00'W, *J. MacDougal et al. 3113* (CAS).—Valle: ca. 3.5 km SE of Coyolito on Isla Zacate Grande, ca. 13°19'N, 87°36'W, *T. Daniel & J. Araque 9821* (CAS, EAP, MO).—Yoro: Río Jacagua, 15 km O de Victoria, *C. Nelson et al. 7039* (TEFH).

The widespread occurrence (in all 18 departments) of this species in Honduras is likely a result of its broad ecological amplitude rather than "weediness," as in some other widely distributed Acanthaceae (e.g., *Blechum pyramidatum*).

**Aphelandra sinclairiana** Nees

This native of southern Central America, which differs from Honduran species by its orange bracts and pink corollas, is known only from cultivation in Honduras.

REPRESENTATIVE SPECIMENS. CORTÉS: garden in San Pedro Sula, *T. Peréz E. s.n.* (EAP, F).

**Asystasia gangetica** T. Anderson

This native of Africa and the Indian Subcontinent is cultivated and possibly naturalized in Honduras.

REPRESENTATIVE SPECIMENS. CORTÉS: garden in San Pedro Sula, *T. Peréz E. s.n.* (EAP).—GRACIAS A DIOS: cultivada en Puerto Lempira, *C. Nelson & E. Vargas 5166* (MO, TEFH).—ISLAS DE LA BAHÍA: Guanaja, Fruit Harbour Bight, *C. Nelson 9970* (TEFH).

**Barleria cristata** L.

This native of southern Asia is probably known only from cultivation in Honduras.

REPRESENTATIVE SPECIMENS. FRANCISCO MORAZÁN: Zamorano, cultivated, *J. Valerio R. 1093* (EAP, F).

**Barleria oenotheroides** Dum. Cours.

Phenology. Flowering: November–January, May; fruiting: December, March–May.

Distribution and habitat. Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana; pine-oak forests, pine forests, moist thickets, along streams; 250–1100 m.

REPRESENTATIVE SPECIMENS. CHOLUTECA: Cerro Guanacauro, 15 km ESE de Choluteca, *C. Nelson 1457* (TEFH).—COMAYAGUA: Chichipates, Río Yure, 30 km E Lago Yojoa, *C. Nelson et al. 6607* (MO, TEFH).—COPÁN: Hwy CA4 between Guatemalan border at Agua Caliente and Santa Rosa de Copán, at Río Higuito near village of Cucuyagua Copán, 14°39'N, 88°53'W, *T. Croat & D. Hannon 63862* (CAS).—EL PARAÍSO: Montaña Cifuentes entre El Urraco y Cifuentes, *A. Molina R. 11421* (EAP, F, NY).—FRANCISCO MORAZÁN: Suyapa, *A. Molina R. 704* (EAP).—INTIBUCÁ: Quebrada Santiago near SW base of Sierra de Montecillos, ca. 24.5 km SW of Siguatepeque toward Jesús de Otoro, ca. 14°31'N, 87°59'W, *T. Daniel & J. Araque 9639* (CAS, EAP).—LEMPIRA: Río Mejocote, 9 km de Gracias, *C. Nelson et al. 247* (MEXU, TEFH).—OLANCHO: Río Patuca, *G. Cruz 113* (TEFH).—SANTA BÁRBARA: along river ca. 1 km E of Santa Bárbara, ca. 14°55'N, 88°14'W, *T. Daniel & J. Araque 9620* (CAS, EAP, K, MO, US).

New World collections of this species have long been identified with the name *Barleria micans* Nees. Daniel (1995a) and Balkwill and Balkwill (1997) have shown that American plants of *B. micans* are conspecific with the western African species *B. oenotheroides*.

**Blechum grandiflorum** Oerst.

Phenology. Flowering: January–April; fruiting: February–May.

Distribution and habitats. Mexico, Guatemala, Honduras, Nicaragua; cloud forests, moist forests, pine forests, moist thickets, cafetales; 400–1700 m.

REPRESENTATIVE SPECIMENS. COMAYAGUA: Montañuelas, *A. Molina R. 11784* (EAP).—CORTÉS: cafetal Los Naranjos near Lago Yojoa, *J. Dickson J178* (EAP).—EL PARAÍSO: Montaña Apauhis sobre Danlí,

1600 m, bosque de nubes, 24 Sep 1952, *A. Molina R. 5119* (type of *Ruellia latibracteata* D. N. Gibson: holotype: F!; isotypes: EAP! GH!).—Francisco Morazán: faldas de Cordillera de Misoco, *A. Molina R. 6054* (EAP, F).—Olancho: along Río Olancho, on road between San Estéban and Bonito Oriental, 3.3 mi SW of border with Colon Dept., along Río Grande, 20.8 mi SW of jct. in hwy to La Ceiba and Trujillo, 15°31'N, 85°42'W, *T. Croat & D. Hannon 64507* (CAS, EAP, MO).—Yoro: Piedra Colorada, *A. Molina R. 6885* (EAP, F).

*Ruellia latibracteata* is treated here as a synonym of *B. grandiflorum*. It was based on collections from several departments of Honduras (Gibson 1972). Most of the collections cited above were originally identified as "Ruellia locuples Standl. & L. Williams," a name that was never validly published. Similar collections from Mexico, Guatemala, and Nicaragua have been treated as either *R. mirandana* Ramamoorthy & Hornelas (Ramamoorthy & Hornelas 1988) or *Blechum grandiflorum* Oerst. (Daniel 1995b; Durkee 2001). Daniel (1995a) discussed the generic position of this species and the generic distinctions between *Blechum* and *Ruellia*. Plants of *R. latibracteata* from Honduras have the diagnostic characteristics of the former genus. Plants from the western portion of the range of the species (Mexico and Guatemala) differ from most of those in the eastern portion of the range (Honduras and Nicaragua; including the type of *R. latibracteata*) by having inconspicuous glandular trichomes on the surfaces of the bracts and bracteoles. Pubescence, if any, on the bracts and bracteoles of most plants from Honduras and Nicaragua consists of a few antrorse to antrorsely appressed eglandular trichomes mostly along the midvein. A few of the inconspicuous glands are evident on *Dickson J178* at EAP, however. In all other features, plants of *R. latibracteata* from Honduras concur with those treated as *B. grandiflorum* elsewhere in tropical America.

**Blechum pyramidatum** (Lam.) Urb.

Phenology. Flowering: November–June; fruiting: November–June.

Distribution and habitats. U.S.A., Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Peru, Bolivia, naturalized in the Old World; pine-oak forests, moist forests, wet thickets, disturbed thickets, waste ground, lawns, along streams; 20–1300 m.

Representative Specimens. Atlántida: Lancetilla Valley, ca. 3 km up Río Lancetilla from Lancetilla Botanical Garden, ca. 15°44'N, 87°27'W, *T. Daniel & J. Araque 9479* (CAS, EAP, MO).—Choluteca: along road between Panamerican Hwy and Cedeño, ca. 1 km S of Las Llanitos, ca. lat. 13°17'N, 87°20'W, *T. Daniel & J. Araque 9815* (CAS, EAP, MO).—Colón: Trujillo, Barrio Cristales, *C. Nelson & J. Martínez 1219* (TEFH).—Comayagua: El Banco, *J. Valerio R. 2335* (EAP).—Copán: Río Copán cerca de Copán Ruinas, *A. Molina R. 6595* (EAP, F).—Cortés: Nacimiento del Río Lindo near Lake Yojoa, *L. Williams & A. Molina R. 12386* (EAP, F).—El Paraíso: Río de los Aguacates N of Yuscarán, *P. Standley 27994* (EAP).—Francisco Morazán: Río Yeguare near San Francisco, ca. 5 km S of El Zamorano, ca. 13°58'N, 86°59'W, *T. Daniel & J. Araque 9455* (CAS, EAP).—Gracias a Dios: Ahuas Bila, 200 km SO de Puerto Lempira, Río Wankí, *C. Nelson & G. Cruz 9318* (TEFH).—Intibuca: Quebrada Santiago near SW base of Sierra de Montecillos, ca. 24.5 km SW of Siguatepeque toward Jesús de Otoro, ca. 14°31'N, 87°59'W, *T. Daniel & J. Araque 9641* (CAS).—Islas de la Bahía: 4 km E of Coxenhole, Roatán Island, *A. Molina R. 20724* (EAP, F, US).—La Paz: Aldea La Florida, 25 km SE de Marcala, *M. Martínez M. 151* (MO).—Ocotepeque: vicinity of Nueva Ocotepeque, *P. Standley 27994* (EAP).—Olancho: ca. 2.5 km above (N) Catacamas on lower slopes of Sierra de Agalta, ca. 14°53'N, 84°54'W, *T. Daniel & G. Pilz 9585* (CAS, EAP).—Santa Bárbara: ca. 9 km SW of Peña Blanca, in wash near Los Laureles and along road to 2 km beyond toward El Higuerón, ca. 14°56'N, 88°04'W, *T. Daniel & J. Araque 9614* (CAS, EAP).—Valle: along road between Panamerican Hwy near San Lorenzo and Coyolito, vicinity of Santa Rosa, ca. 13°26'N, 87°32'W, *T. Daniel & J. Araque 9816* (CAS, EAP).—Yoro: Río Jalegua, 2 km N de Yoro, *C. Nelson & J. Martínez 1871* (TEFH).

**Bravaisia integerrima** (Spreng.) Standl.

Phenology. Flowering: February–May; fruiting: February.

Distribution and habitat. Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Venezuela; primary forests; 10–90 m.

Representative Specimens. Choluteca: 4 km SO de Marcovia, *E. Alexander s.n. (74-16)* (TEFH).—Comayagua: Valle de Comayagua, *D. Hazlett 1189* (EAP).—Gracias a Dios: Cerro Sipul, 1 km E de Krausirpe, 15°03'N, 84°52'W, *P. House 2287* (BM, F, MEXU, MO, TEFH).

This is one of the few arborescent species of Acanthaceae; in Honduras, it reaches heights to 20 meters. Data on *House 2287* attribute a local name ("yauma") to the Tawahka inhabitants in Gracias a Dios, and note that this species is used for firewood and its ash is used to treat maize kernels before grinding them to make tortillas.

**Carlowrightia arizonica** A. Gray

Phenology. Flowering: March; fruiting: March.

Distribution and habitats. U.S.A., Mexico, Guatemala, Honduras, Nicaragua, Costa Rica; habitat unknown; 640 m.

Representative Specimens. Comayagua: El Banco, *J. Valerio R. 2470* (EAP, F).

**Crossandra infundibuliformis** (L.) Nees

This native of Africa, Arabia, and the Indian Subcontinent is known only from cultivation in Honduras.

Representative Specimens. Cortés: San Pedro Sula, *T. Peréz E. s.n.* (F).—Francisco Morazán: vicinity of El Zamorano, *P. Standley 25994* (EAP).

**Dicliptera antidysenterica** A. Molina R.

Perennial herbs or shrubs to 1.5 m tall. Young stems quadrate-sulcate to subhexagonal, ± bifariously pubescent with retrorse to retrorsely appressed eglandular trichomes 0.1–0.3 mm long. Leaves petiolate, petioles to 75 mm long, blades ovate to elliptic, 35–185 mm long, 18–104 mm wide, 1.2–2.1 times longer than wide, acuminate at apex, (truncate to) rounded to acute to subattenuate at base, surfaces pubescent (especially along major veins) with flexuose to antrorse eglandular trichomes. Inflorescence of pedunculate cymes in axils of distal leaves and subfoliose bracts (inflorescence bracts) at or near shoot apex, inflorescence bracts often caducous, rachis pubescent with retrorse to retrorsely appressed eglandular trichomes 0.2–0.4 mm long, trichomes ± concentrated in 2 vertical lines, cymes (1–) 2–3 (–4) per axil, opposite at nodes, peduncles 2–23 mm long, pubescent like rachis, inflorescence bracts petiolate, ovate to narrowly elliptic, 8–18 mm long, 2–5.5 mm wide, pubescent like leaves, paired bracts subtending cymes lance-subulate to lanceolate to lance-ovate to linear, 5–14 mm long, 0.8–2.2 mm wide, abaxial surface nearly glabrous to sparsely pubescent with eglandular trichomes, margin ciliate with erect to flexuose eglandular trichomes to 1.2 mm long; cymules (3–) 4–6 (–7) per cyme, sessile to pedunculate, peduncles to 3 mm long. Outer cymule bracteoles unequal, the larger one obovate (to obovate-elliptic), 8–17 mm long, 1.2–1.7 times longer than shorter one, 2.4–7 mm wide, the shorter one elliptic to ovate, 6.5–10 mm long, 1.8–3 mm wide, both bracteoles rounded to acute (or sometimes slightly apiculate) at apex, mucro absent (or if

present, then up to 0.2 mm long), abaxial surface pubescent with flexuose to antrorse to antrorsely appressed eglandular trichomes 0.1–0.4 mm long, adaxial surface pubescent with flexuose glandular and eglandular trichomes to 0.4 mm long, margin ciliate with erect to flexuose eglandular trichomes to 1.5 mm long. Inner cymule bracteoles lanceolate, 5.5–9 mm long, 0.9–1.4 mm wide, abaxial surface pubescent with flexuose to antrorse eglandular trichomes 0.2–0.3 mm long. Calyx 4–5.5 mm long, lobes subulate, unequal, 3–4 mm long, abaxially pubescent like inner cymule bracteoles. Corolla resupinate, cream-white with faint maroon markings on upper lip, 15–19 mm long, externally pubescent with flexuose eglandular and sometimes glandular (sparse and inconspicuous when present) trichomes 0.2–0.8 mm long, tube 7.5–9.5 mm long, 1–1.5 mm in diameter near midpoint, upper lip 7–11 mm long, 3-lobed, lobes 0.3–0.6 mm long, lower lip 7–11 mm long, entire. Stamens inserted near mouth of corolla tube, 10–12 mm long, filaments pubescent with eglandular (and sometimes a few glandular) trichomes, thecae 1–1.4 mm long, ± equal in size, subparallel to subperpendicular, unequally inserted (overlapping by 0.4–0.7 mm long), dehiscing toward upper lip; pollen (Fig. 2f, g) 3-colporate, 6-pseudocolpate with much deformity and/or fusion of pseudocolpi. Style 14–15 mm long, pubescent with eglandular trichomes, stigma lobes 0.3–0.5 mm long. Capsule substipitate, 6.5–7.5 mm long, pubescent with flexuose glandular (especially near apex) and eglandular trichomes 0.1–0.5 mm long, stipe 0.5–0.8 mm long. Seeds 2.3–3 mm long, 2.2–3 mm wide, surface knobby with low, rounded papillae.

Phenology. Flowering: February–May; fruiting: February–May.

Distribution and habitats. Endemic to Honduras; moist forests, along streams, along trails, cafetales; 760–2100 m

Representative Specimens. Comayagua: along Quebrada Agua Helada, just outside San José de Los Planes, ca. 14 km E of Lago Yojoa, 14°47'N, 87°51'W, *R. Evans 1343* (CAS, EAP, MO, TEFH).—Cortés: cafetal Los Naranjos near Lago Yojoa, *J. Dickson J177* (EAP).—Santa Bárbara: E slopes of Cerro Santa Bárbara, 2100 m, 4 Apr 1951, *P. Allen et al. 6054* (holotype: F!; isotypes: EAP! US!).

In the protologue, Allen's type collection number is erroneously cited as "6056." This species is usually equated with *D. sumichrasti* Lindau (e.g., Gibson 1974), a species described from Mexico. Although studies of *Dicliptera* in Mexico and Central America are incomplete, the distinctions between *D. antidysenterica* and *D. sumichrasti* appear as great as between numerous other species currently recognized in the genus. *Dicliptera antidysenterica* and *D. sumichrasti* can be distinguished by the following couplet:

Inflorescence bracts ovate to narrowly elliptic; outer cymule bracteoles rounded to acute (sometimes slightly apiculate) at apex, emucronate (or mucro, if present, up to 0.2 mm long), margin ciliate with erect to flexuose trichomes to 1.5 mm long; inner cymule bracteoles 5–9 mm long; calyx 4–5.5 mm long; external surface of corolla pubescent with eglandular trichomes only (or glands, if present, very sparse and inconspicuous); capsules pubescent with eglandular and glandular (sometimes only near apex) trichomes. *D. antidysenterica*

Inflorescence bracts lanceolate; outer cymule bracteoles acute to spinose-aristate at apex with mucro to 1 mm long, margin ciliate with antrorse eglandular trichomes 0.1–0.2 mm long; inner cymule bracteoles 3.5–4.7 mm long; calyx 3–3.5 mm long; external surface of corolla pubescent with glandular (conspicuous) and eglandular trichomes; capsules pubescent with eglandular trichomes only. *D. sumichrasti*

In the protologue of *D. antidysenterica*, Molina (1965) noted that roots of of this species (and others of this genus) are crushed and cooked in order to make a remedy for amoebic dysentery in rural regions of Honduras.

**Dicliptera sexangularis** (L.) Juss.

Phenology. Flowering: February–April; fruiting: March–May.

Distribution and habitats. U.S.A., Mexico, Guatemala, Belize, El Salvador, Honduras, Panama, West Indies, Colombia, Venezuela, Surinam, French Guiana, Brazil; moist forests, moist thickets, dry thickets, disturbed areas, along streams; 0–900 m.

Representative Specimens. Comayagua: Quebrada Jeto, vicinity of Comayagua, *P. Standley & J. Chacón P. 6000* (EAP, F).—Cortés: vicinity of La Lima, Río Chamelecón, *P. Standley & J. Chacón P. 7092* (EAP, F).—El Paraíso: Montaña Apahuis, N of Danlí above Los Arcos, ca. 14°01'N, 86°33'W, *T. Daniel & J. Araque 9843a* (CAS, EAP).—Francisco Morazán: finca in Agua Blanca, ca. 5 km SW of Talanga, ca. 14°24'N, 87°07'W, *T. Daniel & G. Pilz 9578* (CAS, EAP).—Islas de la Bahía: Roatán Island, *A. Molina R. 20652* (EAP, F, US).—Olancho: ca. 2.5 km above (N) Catacamas on lower slopes of Sierra de Agalta, ca. 14°53'N, 84°54'W, *T. Daniel & G. Pilz 9584* (CAS, EAP, MO, US).—Santa Bárbara: Los Dragos on Río Chamelecón, SW of Quimistán, *P. Standley & H. Lindelie 7319* (EAP, F).

**Dicliptera unguiculata** Nees

Phenology. Flowering: November–April; fruiting: November–April.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Venezuela, Ecuador, Peru; moist forests, pine-oak forests, moist thickets, along streams, disturbed areas; 800–2000 m.

Representative Specimens. Choluteca: vicinity of San Marcos de Colón, *P. Standley 15737* (EAP, F).—Comayagua: Siguatepeque, *J. Valerio R. 2716* (EAP, F).—Cortés: Aldea Santa Elena, 10 km E de Lago Yojoa, *R. Maldonado 84* (TEFH).—El Paraíso: Mandasta, along road between Manzanagua and Morolica, ca. 8 km SE of San Lucas, 13°44'N, 86°55'W, *T. Daniel & J. Araque 9809* (BR, CAS, EAP, K, MO, TEFH, US).—Francisco Morazán: Zamorano, *J. Valerio R. 3747* (EAP, F, US).—Intibucá: vicinity of La Esperanza and Intibucá, *P. Standley 25599* (EAP, F).—La Paz: near Marcala, *F. Barkley & M. Hernández M. 40073* (GH, TEFH).—Ocotepeque: vicinity of Nuevo Ocotepeque, *P. Standley 27894* (EAP).

Information on the label of *Molina R. 27344* notes the local name "quita díarrea" for this species, and Nelson (1986) noted that it is used as a remedy for dysentery.

**Dicliptera sp.**

Ocotepeque: 10 km NE of Sinuapa, 1300 m, stream bank in mixed forest, 24 January 1976 (flr), *A. Molina R. et al. 31415* (EAP).

Several superficially similar species have been described from Guatemala (e.g., *D. debilis* Leonard, *D. guttata* Standl. & Leonard, *D. inutilis* Leonard, and *D. membranacea* Leonard), but their status and range of morphological variation have not been adequately studied. Several of these species are known only by the types, which are sometimes fragmentary. The Honduran collection noted above superficially resembles these species and *D. antidysenterica*, but differs from all of them by the following combination of characters: paired bracts subtending cymes linear to elliptic, 8.5–10 mm long, 1.1–2.7 mm wide; cymules 3 per cyme, sessile to subsessile; outer cymule bracteoles obovate, unequal, 10.5–15, 4–6 mm wide, abaxially sparsely pubescent eglandular trichomes, margin ciliate with flexuose eglandular trichomes to 1.3 mm long, apex rounded-apiculate; and corolla "fuchsia," resupinate, 30 mm long, externally pubescent with glandular and eglandular trichomes. It may represent an undescribed species, but it would seem imprudent to describe yet another species in this complex, based on a single and fragmentary specimen, at the present time. A better understanding of species of *Dicliptera* in Central America and fruiting collections resembling *Molina R. et al. 31415* should ultimately assist in determining its status. Pollen from this collection is shown in Fig. 2c.

**Dyschoriste capitata** (Oerst.) Kuntze

Phenology. Flowering: February–July; fruiting: February–July.

Distribution and habitats. Mexico, Guatemala, Honduras, Nicaragua; pine forests, open savannas, wet meadows, dry meadows; 1050–1500 m.

Representative Specimens. Comayagua: Siguatepeque, *A. Clewell 3147* (EAP).—Francisco Morazán: Zambrano, *A. Molina R. 14255* (EAP).—Intibucá: alrededores de La Esperanza, Cerro San Cristóbal, *J. Martínez & C. Bejarano 158* (MO, TEFH).

**Dyschoriste quadrangularis** (Oerst.) Kuntze

Phenology. Flowering: October–April; fruiting: November–April.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Nicaragua; moist forests, moist thickets, dry thickets, along streams, disturbed areas; 480–1100 m.

Representative Specimens. Choluteca: vicinity of San Marcos de Colón, *P. Standley 15702* (EAP).—Comayagua: vicinity of Comayagua, *P. Standley & J. Chacón P. 5673* (EAP, F).—Copán: Copán Ruinas airport, *A. Molina R. et al. 32179* (EAP, MO).—El Paraíso: edge of dry lake near Galeras, 800 m, 5 January 1947, *L. Williams & A. Molina R. 11541* (type of *D. hondurensis* Leonard: holotype: US!; isotypes: EAP! GH!).—Francisco Morazán: grounds of Escuela Agrícola Panamericana in El Zamorano, S of livestock sheds, ca. 14°01'N, 87°01'W, *T. Daniel 9788* (CAS, EAP, MO, TEFH).—La Paz: 3 km N de La Paz, *B. Holst 362* (EAP).—Olancho: ca. 1 km upstream on Río Boquerón from Puente Boquerón on Juticalpa–Catacamas hwy., ca. 12 km SW of Catacamas, ca. 14°47'N, 86°00'W, *T. Daniel & G. Pilz 9582* (CAS, EAP).

Examination of the type of *D. hondurensis* Leonard reveals it to be similar in all characters to the widely distributed *D. quadrangularis*, and the former name is herewith placed into the synonymy of the latter. Color of the corollas of plants from Honduras varies from white to pink to purplish. The type of *D. hondurensis* was noted to have blue flowers.

**Elytraria imbricata** (Vahl) Pers.

Phenology. Flowering: October–May; fruiting: October–May.

Distribution and habitats. U.S.A., Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Argentina; moist forests, moist thickets, dry forests, dry thickets, disturbed areas; 20–950 m.

Representative Specimens. Choluteca: La Laguna, *L. Williams & A. Molina R. 12681* (EAP, F).—Comayagua: 11 km O de Zambrano, *C. Nelson & R. Andino 12570* (TEFH).—Copán: Copán Ruins airport, *A. Molina R. et al. 32159* (EAP).—Cortés: Ocote Arrancado, 50 km N de Lago de Yojoa, *C. Nelson et al. 5632* (MO, TEFH).—Francisco Morazán: grounds of Escuela Agrícola Panamericana in El Zamorano, ca. 14°01'N, 87°01'W, *T. Daniel 9464* (CAS, EAP).—Intibucá: Agua Caliente, Las Marías, *J. Martínez 422* (TEFH).—Olancho: between Juticalpa and La Concepción, *P. Standley 17905* (EAP, F).—Santa Bárbara: carretera Chamelecón–Confradía, *A. Molina R. 3872* (EAP, F, GH).—Valle: along road between Puerto Solo and Coyolito, ca. 7 km NE of Coyolito, ca. 13°21'N, 87°36'W, *T. Daniel & J. Araque 9818* (CAS, EAP, TEFH).—Yoro: Victoria, Río Sulaco, *C. Nelson et al. 7178* (MO, TEFH).

The species generally has blue corollas, and those Honduran collections that note corolla color also indicate blue corollas. *Daniel 9824* from Francisco Morazán has corollas entirely white. The population from which this collection was made occurs in a pine plantation on the grounds of the Escuela Agrícola Panamericana. In this population, the ratio of plants with blue flowers to those with white flowers was approximately 1:1 among about 100 individuals seen. Plants grown from seed from these white-flowered individuals have white flowers themselves. Thus, they do not appear to represent an albinic form, but rather an unusual local expression of the species or an unrecognized taxon.

**Eranthemum pulchellum** Andr.

This native of the Indian Subcontinent is known only from cultivation in Honduras.

REPRESENTATIVE SPECIMEN. FRANCISCO MORAZÁN: El Picacho, Tegucigalpa, *J. Valerio R. 3631* (EAP, F).

**Fittonia albivenis** (Lindl. ex Veitch) Brummitt

This native of Andean South America is known only from cultivation in Honduras.

REPRESENTATIVE SPECIMEN. CORTÉS: garden in San Pedro Sula, *P. Standley 29479* (EAP).

**Graptophyllum pictum** (L.) Griff.

This species presumably is native to insular Malesia and is known only from cultivation in Honduras.

REPRESENTATIVE SPECIMEN. CORTÉS: Aldea El Zapotal, 15 km NE de San Pedro Sula, *C. Ortega 199* (TEFH).—FRANCISCO MORAZÁN: Zamorano, *J. Valerio R. 3026* (EAP, F).

**Hemigraphis alternata** (Burm. f.) T. Anderson

This species presumably is native to insular Malesia. It is cultivated in Honduran gardens and purportedly escapes therefrom on occasion. Information on the label of *Molina R. 10380* notes that the plants were a probable escape from cultivation.

REPRESENTATIVE SPECIMENS. ATLÁNTIDA: cerca de Estación Experimental de Lancetilla, *A. Molina R. 10380* (EAP, F).—COMAYAGUA: vicinity of Siguatepeque, *P. Standley & J. Chacón P. 6646* (F).—CORTÉS: San Pedro Sula, jardín, *T. Peréz E. s.n.* (EAP).—FRANCISCO MORAZÁN: cultivada en jardín, campus de la EAP, El Zamorano, *A. Molina R. 14576* (LL).

**Henrya insularis** Nees ex Benth.

Phenology. Flowering: April–May; fruiting: April–June.

Distribution and habitats. U.S.A., Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica; dry thickets; 170–1800 m.

REPRESENTATIVE SPECIMENS. FRANCISCO MORAZÁN: Río Guarabuqui, terranos de los indios Xicaques de la Montaña de La Flor, *A. Molina R. 3017* (EAP, F).—LA PAZ: 6 km N de La Paz, Valle de Comayagua, *B. Holst 1677* (CAS, EAP, MO).—SANTA BÁRBARA: hwy to Copán at double S curve, *J. Dickson 1443* (EAP, US).

**Herpetacanthus panamensis** Leonard

Phenology. Flowering: November; fruiting: November.

Distribution and habitats. Honduras, Nicaragua, Costa Rica, Panama; moist to wet forests; ca. 600 m.

REPRESENTATIVE SPECIMEN. YORO: Cordillera Nombre de Dios, slopes above E part of San José in Río León Valley, between Río Texíguat and Río Guán Guán, 15°30.5'N, 87°27'W, *J. MacDougal et al. 3291* (CAS, MO).

This is the first report of this genus and species in Honduras and represents the northernmost known station for both. *Herpetacanthus* Nees comprises about 10 species occurring in Central America and South America (primarily Brazil). The genus resembles *Justicia* in many features, but its androecium consists of four (vs. two in *Justicia*) fertile stamens (one pair dithecous and one pair monothecous). Indeed, molecular data indicate closer affinities to a lineage of Justicieae including *Pseuderanthemum* and *Odontonema* than to the lineage including *Justicia* (McDade et al. 2000).

Pollen of the two known Central American species is 3-colporate, 6-pseudocolpate. The sole Honduran collection differs from those of *H. panamensis* in southern Central America by its glabrous (vs. sparsely pubescent, at least distally) capsules and inconspicuously (vs. conspicuously) ciliate bracts. It lacks corollas but label data on the specimen notes that buds were white.

**Hygrophila costata** Nees

Phenology. Flowering: September, December–June; fruiting: September, December–June.

Distribution and habitats. U.S.A., Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil, Paraguay, Uruguay, Argentina; moist forests, wet thickets, along streams; 50–1200 m.

Representative Specimens. Atlántida: Lancetilla Valley, ca. 3 km up Río Lancetilla from Lancetilla Botanical Garden, ca. 15°44'N, 87°27'W, *T. Daniel & J. Araque 9484* (CAS, EAP, K, MO, US).—Choluteca: vicinity of San Marcos de Colón, *P. Standley 15780* (EAP, F). –Colón: Trujillo, Río Negro, *S. Cerna 112* (MO, TEFH).—Comayagua: Siguatepeque, *J. Valerio R. 2667* (EAP, F).—Francisco Morazán: Col. Germania, Río Choluteca, *R. Rodríguez 134* (TEFH).—Gracias a Dios: Quebrada de Unawas, 3 km NE de Krausirpe, 15°03'N, 84°50'W, *P. House 1816* (F, MO, TEFH).—Olancho: ca. 22 km NE of Catacamas on road to Dulce Nombre de Culmí, ca. 14°54'N, 85°43'W, *T. Daniel & G. Pilz 9592* (CAS, EAP, MO).

**Hypoestes phyllostachya** Baker

Phenology. Flowering: October, January–May; fruiting: October, January–May.

Distribution and habitats. Madagascar; both widely cultivated and naturalized in the American tropics; gardens, disturbed areas (e.g., roadsides), moist forests, pine-oak forests, dry forests; sea level to 1850 m.

Representative Specimens. Atlántida: garden in Tela, *A. Molina R. & A. Molina 34699* (EAP).—Comayagua: Aldea Agua Dulce, 14 km NE de Siguatepeque, *S. Ramos 107* (TEFH).—El Paraíso: Montaña Navijupe, Frijolares, between Galeras and Manzanagua, 2 km N of Manzanagua, 13°50'N, 86°59'W, *T. Daniel & J. Araque 9794* (CAS, EAP, MO).—Francisco Morazán: along road to Parque Nacional La Tigra, 22–25 km NE of Tegucigalpa, 14°12'N, 87°07'W, *T. Croat & D. Hannon 63977* (CAS, EAP).—La Paz: 7 km S de Marcala, cultivada, *R. Keyser 1643* (EAP).—Yoro: Armenia public school garden, *A. Molina R. 33829* (EAP).

This species is both cultivated and naturalized in Honduras.

**Justicia aurea** Schltdl.

Phenology. Flowering: September–April; fruiting: March.

Distribution and habitats. Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, Panama; wet forests, moist forests, moist thickets; 8–1600 m.

Representative Specimens. Atlántida: Estación Experimental de Lancetilla, *A. Molina R. 10397* (EAP, F).—Cortés: W side of Lake Yojoa near Peña Blanca, *L. Williams & R. Williams 18736* (EAP, F, GH, US). –El Paraíso: vicinity of Danlí, *P. Standley 16525* (EAP, F).—Francisco Morazán: San Juancito camino a Montaña La Tigra, *A. Molina R. 8823* (EAP, F, US).—Gracias a Dios: between Río Plátano and camp, Camp Tiro, 2 mi NW of Bulebar, ca. 15°43'N, 84°50'W, *J. Saunders 1148* (NY).—Lempira: camino a la Montaña Puca entre Guatán y Cuábanos, *A. Molina R. 12910* (EAP, F, NY).—Olancho: trail between Catacamas and La Presa, N of Catacamas, *P. Standley 18565* (EAP, F).—Santa Bárbara: carretera Chamelecon–Cofradia, *A. Molina R. 3860* (F, GH, US). —Yoro: camino de Yoro a la montaña Buenos Aires, *C. Nelson & J. Martínez 1766* (TEFH).

This native species is sometimes cultivated in Honduras.

**Justicia brandegeana** Wassh. & L. B. Sm.

This native of eastern montane Mexico is cultivated in Honduras. Because several herbarium specimens do not indicate that the plants were cultivated, the species might have become naturalized in some places as well. Possibly naturalized plants occur in moist and dry forests at elevations from 460 to 1500 m. Plants flower and fruit from January through July.

Representative Specimens. Copán: Copán Ruinas, *A. Molina R. & A. Molina 34278* (EAP, MO).—Cortés: vicinity of La Lima, *P. Standley & J. Chacón P. 7210* (EAP, F).—El Paraíso: 5 km S de El Paraíso, *N. Pastor 796* (EAP).—Francisco Morazán: Santa Lucia, 10 km NE de Tegucigalpa, *I. Cámbar 166* (CAS, MO).—Lempira: Gracias, *C. Nelson et al. 289* (TEFH).—Olancho: Aldea de Casas Viejas, 6 km NO de Juticalpa, *F. Flores 151* (NY).

**Justicia breviflora** (Nees) Rusby

Phenology. Flowering: March, December; fruiting: March, December.

Distribution and habitats. Mexico, Guatemala, Belize, El Salvador, Honduras; wet forests; 240–300 m.

Representative Specimens. Cortés: Montaña de Río Piedras, *A. Molina R. 3545* (EAP, GH).

This species is apparently known only from two Honduran collections, that cited above and *C. Thieme 5401* (US) from San Pedro Sula.

**Justicia calliantha** Leonard

Perennial herbs or shrubs to 2 m tall or long, sometimes weak and clambering. Young stems subterete to subquadrate, multistriate with greenish striate depressions, evenly or bifariously pubescent with flexuose to retrorse eglandular trichomes 0.2–1 mm long. Leaves petiolate, petioles to 18 mm long, blades ovate to broadly ovate to cordate, 25–103 mm long, 16–56 mm wide, 1.3–1.9 times longer than wide, (rounded to) acute to acuminate at apex, truncate to rounded to cordate at base, surfaces pubescent (mostly along major veins) with erect to flexuose eglandular trichomes, margin entire. Inflorescence of opposite or alternate pedunculate clusters of flowers in leaf axils, peduncles 5–17 mm long, evenly pubescent with erect to flexuose eglandular trichomes 0.1–1 mm long, clusters 1–5-flowered, 1 cluster per axil, sometimes with a short rachis evident among flowers, rachis (if present) pubescent like peduncles. Bracts opposite to alternate, (lance-ovate to) subulate, 3–5.3 mm long, 0.5–1.3 mm wide, abaxial surface pubescent with an understory of erect eglandular and/or subglandular to glandular trichomes to 0.1 mm long and an overstory of erect to flexuose eglandular (and sometimes glandular) trichomes 0.2–0.5 mm long. Bracteoles subulate, 3.5–6 mm long, 0.5–7 mm wide, pubescent like bracts. Flowers sessile to short-pedicellate (i.e., pedicels to 2 mm long). Calyx 4-lobed, 6–9.5 mm long, lobes lanceolate, 4–8 mm long, 0.8–1.3 mm wide, abaxially pubescent with an understory of erect subglandular to glandular trichomes to 0.1 mm long and an overstory of erect to flexuose glandular and eglandular trichomes 0.2–0.3 mm long. Corolla red, 29–33 mm long, external surface pubescent with erect to flexuose glandular and eglandular trichomes 0.1–0.3 mm long, tube 15–18 mm long, gradually expanded distally, 2.8–3 mm in diameter near midpoint, throat not evident, upper lip 13–17 mm long, 2-lobed, lobes to 0.5 mm long, lower lip 16–19 mm long, lobes 0.5–1.5 mm long, 0.8–2 mm wide, central lobe largest. Stamens 14–16 mm long, filaments glabrous (at least distally), thecae 2–3.2 mm long, subparallel to perpendicular, unequally inserted, overlapping by 1.9–2 mm, unequal in size (distal theca larger), distal theca dorsally

pubescent with eglandular trichomes; pollen (Fig. 5a) 2-aperturate, apertures flanked on each side by 2 rows of insulae. Style 26–31 mm long, proximally pubescent with eglandular trichomes, distally glabrous, stigma unequally 2-lobed, 1 lobe 0.2 mm long, other lobe rudimentary. Capsule 15–20 mm long, externally pubescent with erect to retrorse glandular and eglandular trichomes to 0.2 mm long, head ellipsoid with medial constriction, 9–13 mm long. Seeds 4, 3.8–4.8 mm long, 3.5 mm wide, surfaces and margin with prominent conical tubercles.

Phenology. Flowering: November–March; fruiting: December–March.

Distribution and habitats. Endemic to Honduras; oak forests, thornscrub, along streams; 600–1050 m.

Representative Specimens. Comayagua: Los Jícaros, 5 km SE de Lamaní, *B. Holst 626* (EAP).—El Paraíso: Las Casitas, *P. Standley et al. 620* (EAP, F).—Francisco Morazán: Río Yeguare near San Francisco, 800 m, rocky knolls, 24 November 1946, *L. Williams & A. Molina R. 10971* (holotype: US!; isotype: EAP!).

This species is very similar to three species from Mexico and Central America, *Justicia nicaraguensis* Durkee, *J. sulphurea* (Donn. Sm.) D. N. Gibson, and *J. torresii* T. F. Daniel. It differs from all of these by its corollas, which are red (vs. yellow or orange) and pubescent with both glandular and eglandular (vs. eglandular only) trichomes.

**Justicia candelariae** (Oerst.) Leonard

Phenology. Flowering: January–April; fruiting: March–April.

Distribution and habitats. Mexico, Guatemala, Belize, Honduras, Costa Rica, Panama; moist forests; 970–1500 m.

Representative Specimens. Comayagua: Quebrada El Rincón, between El Portillo and El Porvenir, 10 km W of Siguatepeque, *A. Molina R. & A. Molina 25461* (EAP, F, US).—La Paz: La Florida de Marcala, 1 km N de la escuela nueva, *R. Keyser 1707* (EAP).

**Justicia carthagenensis** Jacq.

Phenology. Flowering: October–January; fruiting: November–January.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Venezuela, Surinam, French Guiana, Ecuador, Peru; scrub forests, swampy thickets, disturbed thickets, along streams; 0–960 m.

Representative Specimens. Choluteca: along road between Panamerican Hwy and Cedeño, ca. 1 km S of Las Llanitos and ca. 14 km S of Panamerican Hwy, 13°17'N, 87°20'E, *T. Daniel & J. Araque 9814* (CAS, EAP, MO, TEFH).—Comayagua: Agua Caliente, vaguada de ríos Chamo y Humuya, *C. Nelson et al. 6502* (TEFH).—Cortés: orilla del Río Humuya, 40 km N Santa Cruz de Yojoa, *C. Nelson et al. 5839* (MO, TEFH).—Francisco Morazán: Valle de Zamorano, 30 km E de Tegucigalpa, *A. Oviedo 2* (TEFH).—Gracias a Dios: Río Segovia, *C. Nelson & E. Vargas 4972* (MO, TEFH).—Valle: along Salamar beach, 2 km E of San Lorenzo, Fonseca Gulf, *A. Molina R. & A. Molina 22760* (DS, EAP, F, NY).—Yoro: Victoria, Río Sulaco, *C. Nelson 7035* (MO, TEFH).

**Justicia ciriloi** T. F. Daniel, nom. nov. *Beloperone blechioides* Leonard, J. Wash. Acad. Sci. 32: 186.1942, non *Justicia blechoides* (Lindau) Stearn, 1971.—Type: Guatemala. Chiquimula: Montaña Nonojá, 3–5 mi. E of Camotán, 600–1800 m, 11 Nov 1939, *J. Steyermark 31740* (holotype: F!).

Perennial herbs to 1 m tall. Young stems subterete to subquadrate, pubescent with an inconspicuous understory (sometimes absent) of erect glands 0.05–0.5 mm

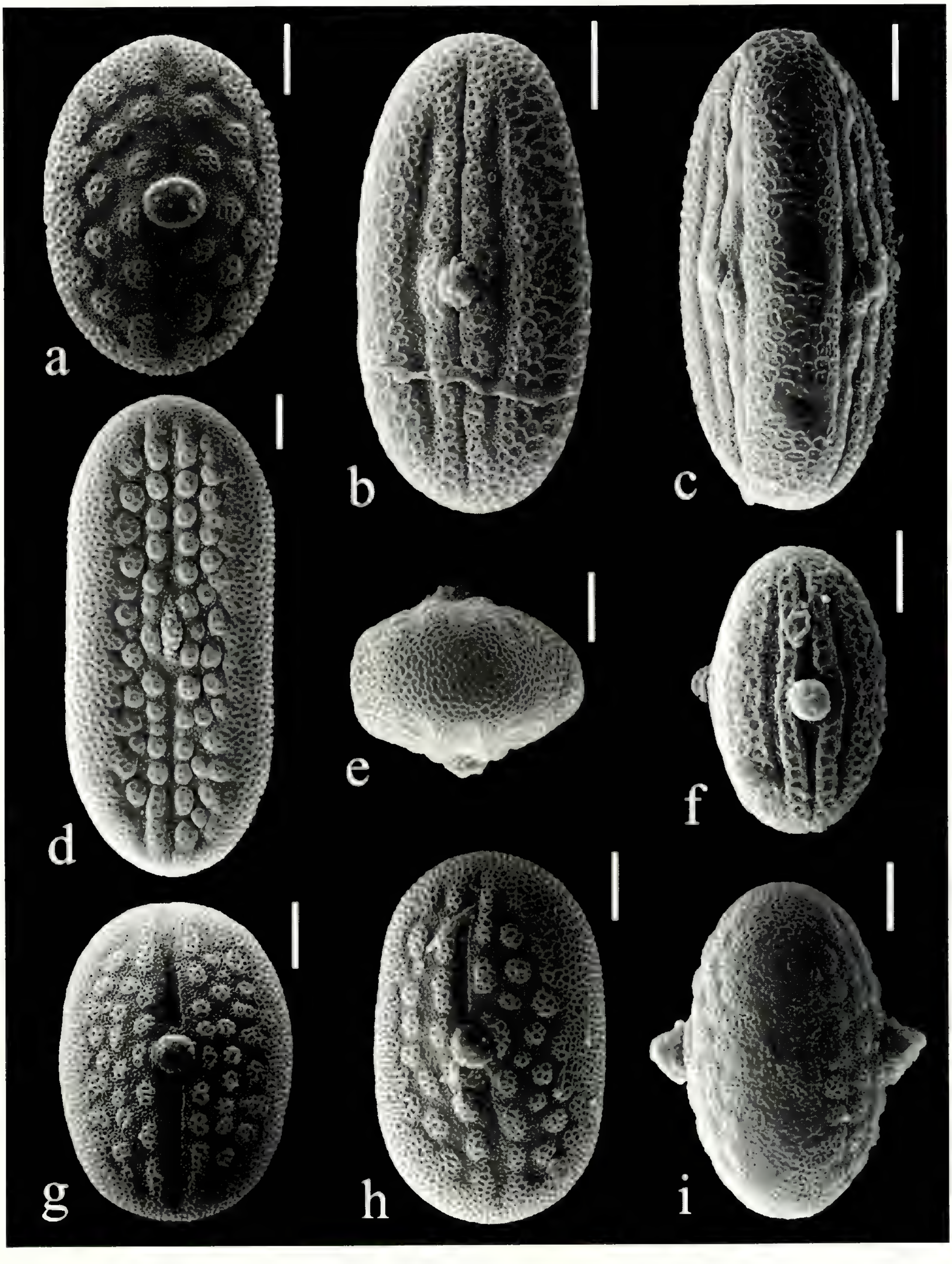


FIG. 5. Pollen of *Justicia*. a. *J. calliantha* (*Molina R. 18571*), apertural view. b. *J. ciriloi* (*Nelson et al. 6773*), apertural view. c. *J. ciriloi* (*Nelson et al. 6773*), interapertural view. d. *J.* sp. (*Dickson 1450*), apertural view. e. *J.* sp. (*Dickson 1450*), polar view. f. *J. tuxtlensis* (*Molina 20851*), apertural view. g. *J. ramulosa* (*Croat & Hannon 64117*), apertural view. h. *J. ramulosa* (*Wood 11161* from Bolivia), apertural view. i. *J. ramulosa* (*Zardini 4585* from Paraguay), interapertural view. Scale bar = 10 μm.

long and an overstory of erect to flexuose eglandular trichomes 0.5–1.5 mm long, trichomes ± evenly disposed (at least on youngest growth) or concentrated in (but not restricted to) 2 lines. Leaves petiolate, petioles to 27 mm long, blades ovate, 50–135 mm long, (17–) 23–62 mm wide, 2–2.9 times longer than wide, acuminate at apex, rounded to acute to subattenuate at base, surfaces pubescent with flexuose to

antrorse eglandular trichomes and abaxial surface (especially midvein) and margin with an understory of glandular trichomes 0.05–0.5 mm long as well, glandular trichomes present on leaves even when absent on young stems, margin entire to sinuate-crenate. Inflorescence terminal sessile to pedunculate densely bracteate 4-sided dichasiate spikes to 5.5 cm long (including peduncle and excluding flowers), 20–25 mm in diameter near midspike, peduncles to 15 mm long, pubescent like young stems, rachis pubescent like young stems; dichasia opposite, 1-flowered, 1 per axil, sessile. Bracts opposite, usually tinged with maroon along margin (at least near apex), sessile (or proximal bracts subfoliose and petiolate), ovate to ovate-elliptic, 13–19 mm long, 8–10 mm wide (proximal bracts often subfoliose and larger), apically rounded to acute to subacuminate, abaxial surface pubescent with antrorse eglandular trichomes 0.1–0.7 mm long, margin ciliate with flexuose eglandular trichomes to 1.3 mm long. Bracteoles linear-elliptic to elliptic, 7–13 mm long, 1.4–3 mm wide, pubescent like bracts. Flowers sessile. Calyx 5-lobed, 6–8.3 mm long, lobes lanceolate to linear-elliptic, subequal, 4.5–7.5 mm long, 0.9–1.2 mm wide, abaxially pubescent like bracts. Corolla white or yellow with maroon markings on the lips, 28–36 mm long, externally pubescent with flexuose eglandular trichomes 0.2–1 mm long, tube subcylindric to ± gradually expanded distally, 16–22 mm long, upper lip 9.5–15 mm long, 2-lobed, lobes 0.4–0.6 mm long, lower lip 9.5–18 mm long, lobes 1–5 mm long, 1.6–4 mm wide. Stamens inserted near apex of corolla tube, 12–17 mm long, filaments pubescent with flexuose eglandular trichomes, thecae maroon tinged, 1.5–2.2 mm long (including basal appendage), equal, subparallel to subperpendicular, superposed (contiguous or with gap to 0.3 mm long), dorsally pubescent with cobwebby eglandular trichomes, lower theca with a bulbous basal appendage 0.4–0.6 mm long; pollen (Fig. 5b, c) either 3-colporate and 6-pseudocolpate or 3-aperturate with apertures flanked on each side by 1 row of insulae or exhibiting an intermediate state between these two extremes. Style 19–25 mm long, pubescent with eglandular trichomes, stigma subequally to unequally 2-lobed, lobes 0.05–0.2 mm long. Capsule 9–10 mm long, pubescent with erect to flexuose eglandular trichomes 0.1–0.5 mm long, stipe 3–3.5 mm long, head ovoid to subspheric, 6 mm long. Seeds 4, lenticular, 2.5–3 mm long, 2–2.1 mm wide, minutely papillose, lacking trichomes.

Phenology. Flowering: December–January; fruiting: January.

Distribution and habitats. Guatemala, Honduras; riparian forests; 200–300 m.

Representative Specimens. Comayagua: Chichipates, orilla del Río Yure, 30 km E Lago Yojoa, *C. Nelson et al. 6608* (TEFH, MO), *6773* (MO, TEFH).—Yoro: orilla del Río Jacagua, 15 km O de Victoria, *C. Nelson et al. 7250* (TEFH).

These Honduran collections, made in 1980 and 1981, greatly resemble the type, and only known collection, of *Beloperone blechioides* from the department of Chiquimula in east-central Guatemala. They represent the first records of the species in Honduras, and apparently the first collections of the species since that of the type in 1939. In 1984, J. Simmons collected cuttings of this species in the department of Yoro (42 km E of Santa Rita to Morazán); these were subsequently grown at the Royal Botanic Gardens, Kew. A specimen from the plants cultivated at Kew was sent to CAS (CAS 930274) and conforms to the description above.

Because *Beloperone* is now treated as congeneric with *Justicia*, and because a confusingly similar epithet (i.e., "blechoides") has already been used in the latter genus, a new name is provided above for this "rediscovered" taxon, as allowed by Articles 11 and 53 of the International Code of Botanical Nomenclature (Greuter

et al. 2000). The name honors Prof. Cirilo Nelson (b. 1938) of the Universidad Autónoma de Honduras, who participated in the collection of all recent Honduran specimens of it.

Labels of the Honduran collections note that corollas were yellow or white-yellow. Label data on the type of *B. blechioides* notes that corollas were "white spotted with purple around lip. " Living plants cultivated at Kew from Simmons's cuttings (seen in 2002) have pale yellow corollas with maroon markings on the lips.

Gibson (1974) noted that *Justicia fulvicoma* Schltdl. (including *Beloperone belchioides* in her circumscription of that species) was known from Honduras. The basis for her inclusion of Honduras within the range of this species remains unknown. The illustration (her Fig. 87) labeled as "*Justicia fulvicoma*" in her treatment of Guatemalan Acanthaceae pertains to *J. ciriloi*. Information in the description above includes measurements from the Guatemalan type.

**Justicia colorifera** V. A. W. Graham

Phenology. Flowering: March–April, July; fruiting: March–April.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia; thickets, hedges; 1050–1215 m.

Representative Specimens. Comayagua: vicinity of Siguatepeque, *P. Standley & J. Chacón P. 6179* (EAP).—Cortés: San Pedro Sula, *C. Thieme 5400* (GH, US).—La Paz: along Marcala River, vicinity of Marcala town, *A. Molina R. & A. Molina 24272* (CAS, EAP, F, NY).

Known in Honduras as "sacatinta" and "añil" (fide *Standley & Chacón P. 6179*); both names allude to the use of this plant as a dye and as a bluing agent in laundering fabric.

**Justicia comata** (L.) Lam.

Phenology. Flowering: November–January, April–July; fruiting: December–January, April–July.

Distribution and habitats. Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil, Paraguay, Argentina, introduced into Asia; wet depressions in moist to wet forests, around lakes, swamps, along streams; 0–800 m.

Representative Specimens. Atlántida: Lancetilla Valley, ca. 3 km up Río Lancetilla from Lancetilla Botanical Garden, ca. 15°44'N, 87°27'W, *T. Daniel & J. Araque 9481* (CAS, EAP, K, MICH, MO, US).—Colón: Trujillo, 5 km W of airport, old road to Castilla, *J. Saunders 985* (NY).—Comayagua: Pitosolo, Lago Yojoa, *J. Valerio R. 2957* (EAP, F).—Cortés: San Pedro Sula, *C. Thieme 5399* (CAS, GH, US).—Francisco Morazán: Río Yeguare, *J. Valerio R. 989* (EAP, F).—Gracias a Dios: Klauban, poblado al W de Brus, *E. Vargas et al. 351* (MEXU, MO).—Olancho: vicinity of Juticalpa, *P. Standley 17711* (EAP, F).—Santa Bárbara: alrededores de Santa Bárbara, Río Ulúa, *A. Molina R. 3803* (EAP).—Yoro: Quebrada Seca, *P. Standley 53921* (F, US).

**Justicia ensiflora** (Standl.) D. N. Gibson

Phenology. Flowering: August, November; fruiting: August, November.

Distribution and habitats. Guatemala, Belize, Honduras; moist forests; 50 m.

Representative Specimens. Cortés: Aldea La Pita, 5 km SO de Puerto Cortés, *C. Nelson et al. 3054* (MO, TEFH).—Yoro: "Coyol" [Coyoles, now Coyoles Central, fide C. Nelson, in litt. ], *M. Carleton 501* (US).

**Justicia macrantha** Benth.

Phenology. Flowering: October–January; fruiting: unknown.

Distribution and habitats. Mexico, Guatemala, Honduras, Costa Rica, Panama; moist forests, roadsides; 700–1300 m.

Representative Specimen. Olancho: cañón del río del Monumento Natural El Boquerón, ca. 28 km NE de Juticalpa, *J. Linares & J. López 1847* (EAP).

**Justicia micrantha** (Oerst.) V. A. W. Graham

Phenology. Flowering: March–May; fruiting: March–May.

Distribution and habitats. Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Ecuador; moist thickets, pine-oak forests, dry thickets, dry forests; 220–700 m.

Representative Specimens. Comayagua: Agua Caliente, vaguada de ríos Chamo y Humuya, 35 km E Lago Yojoa, *C. Nelson et al. 6379* (TEFH).—El Paraíso: Valle Jamastrán entre Río Los Almendros y Chichicaste, *A. Molina R. 11390* (EAP, F, LL, NY).—Olancho: ca. 1 km upstream on Río Boquerón from Puente Boquerón on Juticalpa–Catacamas hwy, ca. 12 km SW of Catacamas, ca. 14°47'N, 86°00'W, *T. Daniel & G. Pilz 9583* (CAS, EAP, K, MICH, MO, US).—Yoro: Victoria, orilla del Río Sulaco, *C. Nelson et al. 7036* (MO).

Pollen of *Daniel & Pilz 9583* is 2-aperturate with apertures flanked on each side by 2 rows of insulae (Fig. 6a, b). This species was originally described from Nicaragua as *Chaetothylopsis micrantha* Oerst. It has been treated under the names *Chaetothylax leucanthus* Leonard (described from Colombia) and *Justicia rothschuhii* (Lindau) Durkee (=*Chaetothylax rothschuhii* Lindau; also described from Nicaragua).

**Justicia pectoralis** Jacq.

Phenology. Flowering: January–April, August; fruiting: February.

Distribution and habitats. Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Peru, Bolivia, Paraguay, Brazil, Argentina; wet depressions in moist to wet forests, along streams; 30–1400 m.

Representative Specimens. Atlántida: Lancetilla Valley, ca. 3 km up Río Lancetilla from Lancetilla Botanical Garden, ca. 15°44'N, 87°27'W, *T. Daniel & J. Araque 9480* (CAS, EAP, K, MO, US).—Comayagua: Siguatepeque, *J. Valerio R. 2737* (EAP, F).—Copán: Copán Ruinas, cultivated in hotel garden, *A. Molina R. & A. Molina 34285* (EAP).—El Paraíso: Trincheras, 5 km S de El Paraíso, *N. Pastor 804* (EAP).—Francisco Morazán: Zamorano, *J. Valerio R. 3723* (EAP).—Gracias a Dios: Río Mocorón, aldea de Mocorón, *C. Nelson & E. Vargas 5047* (MO, TEFH, US).—Olancho: trail between Catacamas and la presa, N of Catacamas, *P. Standley 18551* (EAP, F).

This native species is sometimes cultivated in Honduras.

**Justicia pilzii** T. F. Daniel, sp. nov.—Type: Honduras. Atlántida: 1–2 km NNW of Cabeza del Negro, 15°29'N, 87°27'W, 200–500 m, 26 April 1994, *D. Hazlett & A. Brant 8096* (holotype: EAP!; isotypes: BM! CAS! MEXU! MO!).

Fig. 7.

Herbae perennes vel frutices usque ad 1 m alti. Folia petiolata, laminae nodo inaequalibus, margine integris. Inflorescentia floribus in spicas axillares (vel terminales); dichasia uniflora, alterna, sessilia. Bracteae subulatae vel lineares vel anguste ellipticae, 0.8–2 mm longae. Calyx 5-lobus, 3–4.1 mm longus, lobis homomorphis.

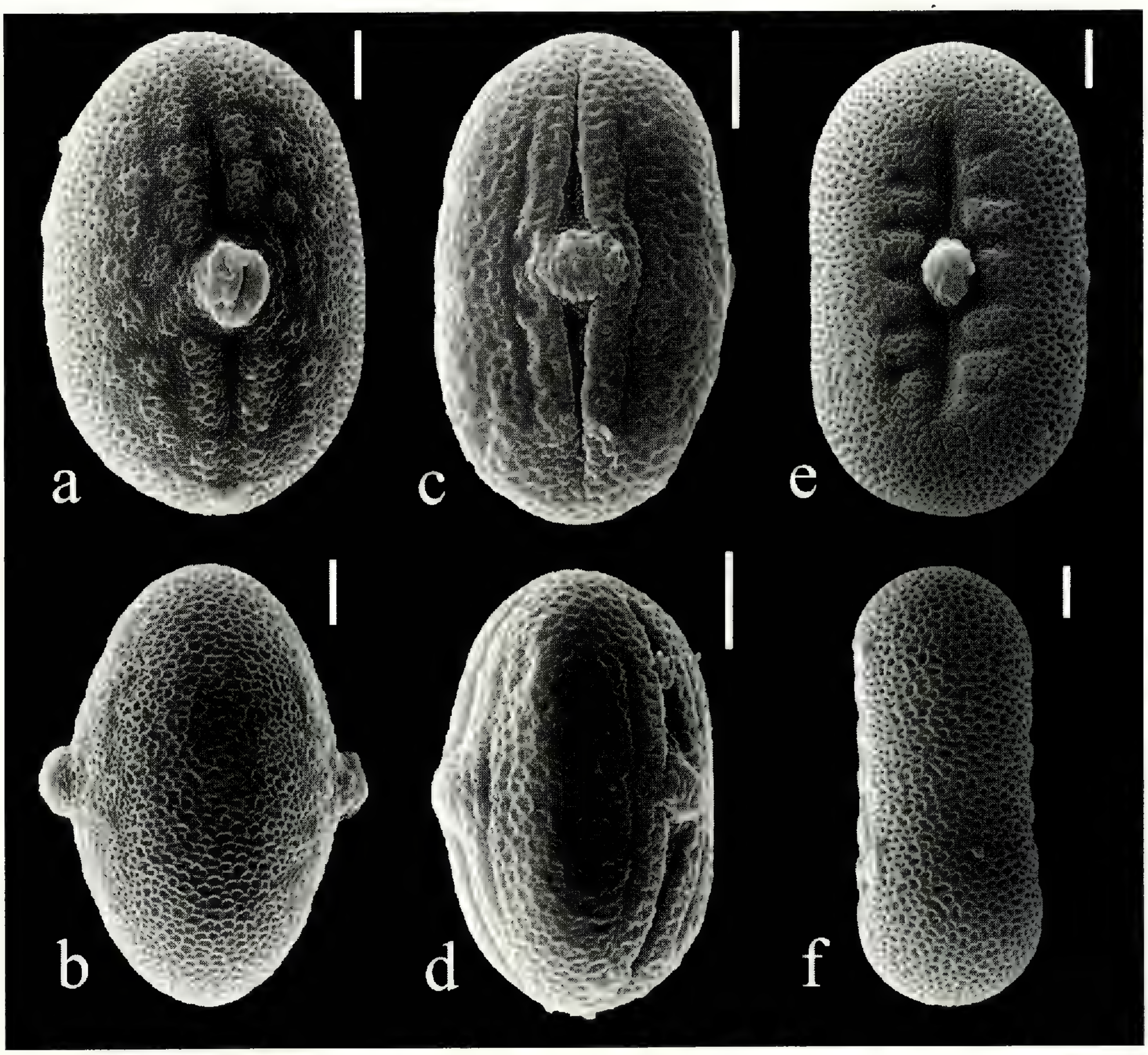


FIG. 6. Pollen of *Justicia*. a. *J. micrantha* (*Daniel & Pilz 9583*), apertural view. b. *J. micrantha* (*Daniel & Pilz 9583*), interapertural view. c. *J. pilzii* (*Hazlett & Brant 8096*), apertural view. d. *J. pilzii* (*Hazlett & Brant 8096*), interapertural view. e. *J. trichotoma* (*Chacón G. 1015*), apertural view. f. *J. trichotoma* (*Chacón G. 1015* from Costa Rica), interapertural view. Scale bar = 6 μm.

Corolla viridi-alba vel viridi-lutea et purpureo-notata, 6.5–10 mm longa, extus pubescens trichomatibus eglandulosis. Stamina thecis 0.8–1.2 mm longis, pubescentibus, theca inferna basi calcarata. Capsula 6.5–10 mm long, pubescens trichomatibus eglandulosis.

Perennial herbs to shrubs to 1 m tall. Young stems quadrate to quadrate-sulcate to ± flattened, pubescent with antrorse eglandular trichomes 0.1–0.3 mm long, trichomes often conspicuously septate with maroon septa, appearing ± evenly disposed or concentrated in 2 lines. Leaves petiolate, petioles to 13 mm long, blades ovate-elliptic to broadly elliptic, those of a pair at nodes unequal in size, larger blades 23–95 mm long, 13–34 mm wide, 1.4–3.6 times longer than wide, smaller blades 5–53 mm long, 3–25 mm wide, 1.2–2.1 times longer than wide, larger blades 1.8–9.6 times longer than smaller blades, all blades (rounded to) acute to acuminate at apex, (rounded to) acute (to attenuate) at base, surfaces pubescent with antrorse to antrorsely appressed eglandular trichomes restricted to major veins, margin entire. Inflorescence of axillary (and terminal) pedunculate dichasiate spikes to 20 mm long (including peduncle and excluding flowers), spikes opposite or alternate at nodes, peduncles to 6 mm long, rachis evenly pubescent with erect to flexuose to antrorse eglandular trichomes 0.05–0.2

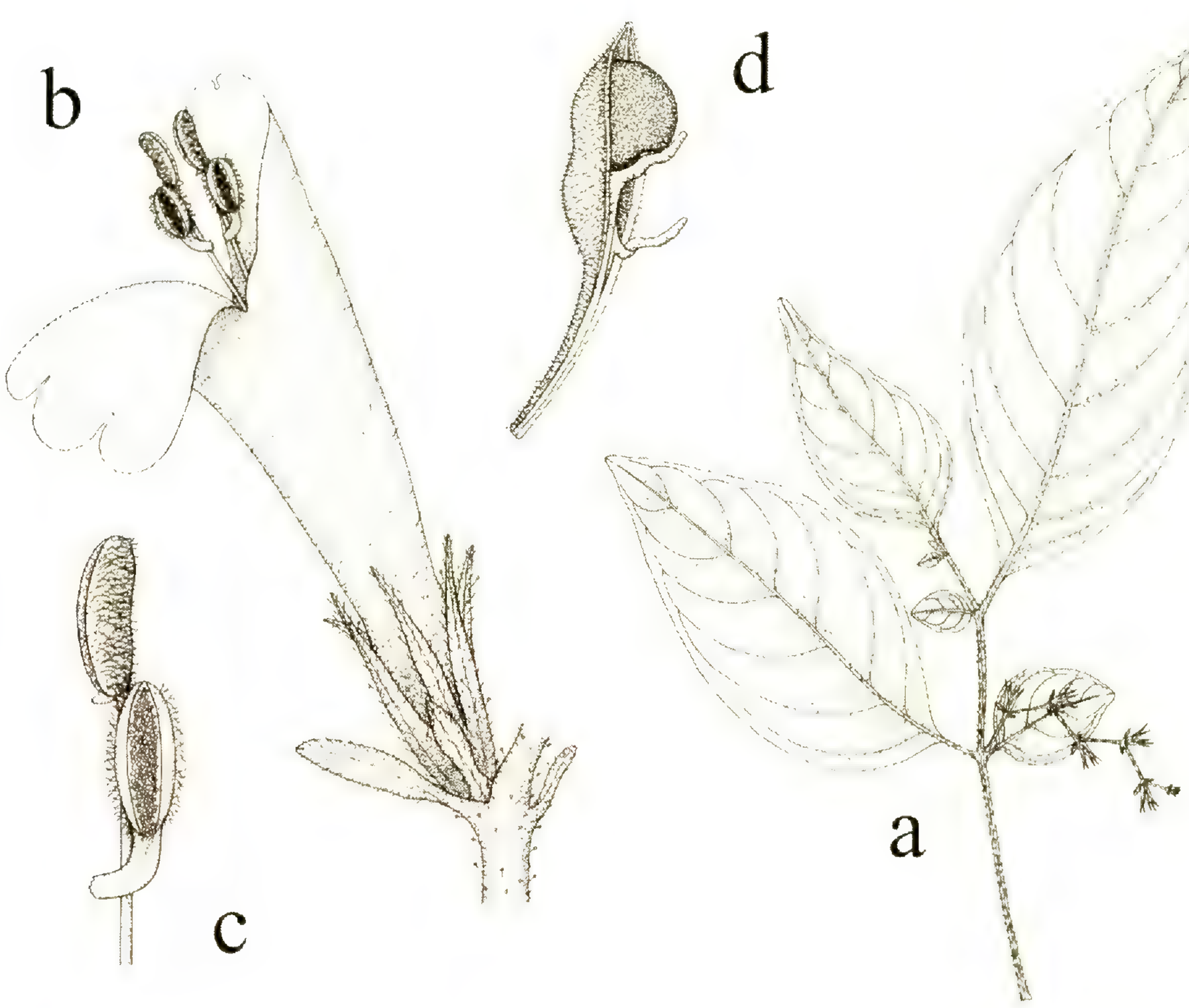


FIG. 7. *Justicia pilzii* a. Branch (*Hazlett & Brant 8096*), ×0.9. b. Inflorescence node with flower (*Wilson 219*), ×7. c. Distal portion of stamen with anther (*Wilson 219*), ×19. e. Capsule valve with seed (*Hazlett & Brant 8096*), ×4.7. Drawn by Jennifer Kane.

mm long and erect to flexuose glandular trichomes 0.1–0.3 mm long (glandular pubescent); dichasia 1-flowered, alternate (but not secund), sessile. Bracts opposite to subopposite, subulate to linear to narrowly elliptic, 0.8–2 mm long, 0.3–0.6 mm wide, abaxial surface glandular pubescent (or glandular trichomes sometimes absent). Bracteoles subulate to linear, 0.7–1.5 mm long, 0.2–0.4 mm wide, abaxial surface pubescent like bracts. Flowers subsessile (i.e., borne on pedicels to 0.5 mm long). Calyx 5-lobed, 3–4.1 mm long, lobes lance-subulate, equal in size, 2.3–3.5 mm long, abaxially glandular pubescent. Corolla greenish white to greenish yellow with purple markings, 6.5–10 mm long, externally pubescent with erect to flexuose eglandular trichomes 0.1–0.3 mm long, tube 5–7 mm long, upper lip 2–3.5 mm long, entire to emarginate at apex, lower lip 2–3.8 mm long, lobes 0.5–0.8 mm long, 0.6–0.9 mm wide. Stamens 3 mm long, thecae unequally inserted (overlapping by 0.1–0.2 mm) to superposed (contiguous), parallel, 0.8–1.2 mm long (including basal appendage), unequal in size (lower theca longer), pubescent with flexuose eglandular trichomes, upper theca with a basal appendage up to 0.1 mm long, lower theca with basal appendage 0.4–0.5 mm long; pollen (Fig. 6c, d) 3-colporate, 6-pseudocolpate, exine reticulate to bireticulate. Style 5–7 mm long, proximally pubescent and distally glabrous, stigma ± funnelform, 0.1 mm long. Capsule 6.5–10 mm long, externally pubescent with erect to flexuose to retrorse eglandular trichomes 0.1–0.3 mm long. Seeds 4, lenticular, 1.7–2.3 mm long, 1.7–2.2 mm wide, surface smooth to ± rugose.

Phenology. Flowering: January, April; fruiting: April.

Distribution and habitats. Endemic to Honduras; along streams and in thickets in wet forests; 20–200 m.

PARATYPES. **Honduras.** ATLÁNTIDA: vicinity of San Alejo, base of hills S of San Alejo near Río San Alejo, *P. Standley 7598* (EAP, F); Lancetilla Valley, near Tela, *P. Standley 52969* (F), *55396* (A, F); along trail W of Tela River, Puerto Sierra, *P. Wilson 219* (NY).

The species is readily recognizable among Honduran Acanthaceae by the conspicuously unequally sized leaves at each node. Honduran specimens of this species were treated by Standley (1931) as *J. trichotoma* (Kuntze) Leonard. Both species occur in wet forests of the Caribbean lowlands. While *J. pilzii* resembles *J. trichotoma* of southern Central America by its antrorse cauline trichomes, anisophyllous leaves, similar inflorescences, equally 5-lobed calyces, relatively small and similarly shaped corollas, and pubescent thecae, it differs in numerous significant characters, which are summarized in the following couplet:

Cauline trichomes eglandular; leaf margin entire; calyx 3–4.1 mm long; corolla 6.5–10 mm long; thecae 0.8–1.2 mm long, the lower theca with a basal appendage 0.5 mm long; pollen 3-aperturate, apertures flanked on each side by a pseudocolpus (i.e., 6-pseudocolpate); capsule 6.5–10 mm long; seed surface smooth to rugose; Honduras. *J. pilzii*

Cauline trichomes usually with some glandular trichomes present; leaf margin sinuate; calyx 6.5–9 mm long; corolla 15–17 mm long; thecae 0.5–0.7 mm long, the lower theca with a basal appendage 0.2 mm long; pollen 2-aperturate, apertures flanked on each side by peninsulae; capsule 12–15 mm long; seed surface gemmate to baculate; Costa Rica and Panama. *J. trichotoma*

The palynological differences (Fig. 6c–f) were noted in multiple collections of each species (*J. pilzii*: *Hazlett & Brant 8096*, *Standley 55396*, and *Wilson 219*; *J. trichotoma*: *Chacón G. 1015*, *Hammel 7736*, and *Jiménez M. 1909*).

Although present, glandular trichomes are neither as numerous nor conspicuous in the inflorescence of *Wilson 219* as in the other collections of *J. pilzii* observed.

The epithet of this species honors Dr. George Pilz (b. 1942) of the Escuela Agrícola Panamericana in Honduras, student of Nyctaginaceae, devoted teacher and amiable colleague, who helped make this account possible.

**Justicia ramosa** (Oerst.) V. A. W. Graham

Phenology. Flowering: throughout the year; fruiting: December, March–August.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Costa Rica, Colombia; moist forests, moist thickets, along streams, oak thickets, dry thickets, dry forests, thornscrub; 400–1300 m.

REPRESENTATIVE SPECIMENS. COMAYAGUA: El Banco, *J. Valerio R. 2449* (EAP, F).—EL PARAÍSO: road between Yuscarán and Oropolí, 10–14 km N of Oropolí, ca. 13°55'N, 86°48'W, *T. Daniel et al. 9566* (CAS, EAP, MO, US).—FRANCISCO MORAZÁN: ca. 21 km SE of Talanga along road to Villa de San Francisco, ca. 14°14'N, 87°01'W, *T. Daniel & G. Pilz 9608* (CAS, EAP, K, MO, US).—OCOTEPEQUE: vicinity of Nueva Ocotepeque, *P. Standley 27993* (EAP).—OLANCHO: vicinity of Catacamas, *P. Standley 18161* (EAP, F).

Both Gibson (1974; see under *Siphonoglossa* Oerst.) and Durkee (2001) treated *J. ramosa* and *J. sessilis* Jacq. as conspecific. Hilsenbeck (1989; as *Siphonoglossa*) studied these species and their types in detail and concluded that they are distinct on the basis of the flowers (sessile in the leaf axils in *J. sessilis* vs. borne in bracteate spikes in *J. ramosa*) and seeds (surface with bullate encrustations 0.3–0.5 mm long in *J. ramosa* vs. surface with tuberculate or papillose protuberances 0.1–0.2 mm in diameter in

*J. sessilis*). Until they are again thoroughly studied from throughout their ranges, both species, as distinguished by Hilsenbeck, are recognized here. As treated here, *J. ramosa* includes *Siphonoglossa hondurensis* Standl. & Steyerm. [=*S. ramosa* var. *hondurensis* (Standl. & Steyerm.) Hilsenb.], the type of which was collected in Honduras [Francisco Morazán: región de La Travesía, cerca de Suyapa, 1100 m, 18 Sep 1948, *P. Standley 12459* (holotype: F!; isotype: EAP!)]. Hilsenbeck (1989) indicated that var. *hondurensis* could be distinguished from var. *ramosa* by its dark brown stems, more ovately-lanceolate leaves, and usually shorter corollas. These characters appear to vary throughout the range of the species. As noted by Ayers and Boufford (1988), the type of *Justicia rhodioides* Leonard from Colombia also pertains to this species.

**Justicia ramulosa** (Morong) C. Ezcurra

Phenology. Flowering: January–March; fruiting: May.

Distribution and habitats. Guatemala, Honduras, Peru, Bolivia, Brazil, Paraguay, Argentina; moist forests, cafetales; 400–600 m.

Representative Specimens. Copán: vicinity of ruins near Copán Ruinas, ca. 14°51'N, 89°08'W, *T. Daniel & J. Araque 9624* (CAS, EAP, K, MICH, MO, US).—Olancho: along Río Olancho, W of main Tegucigalpa–Catacamas hwy, ca. 1 km upstream from and NW of Puente Boquerón, 8.6 mi SW of Catacamas, 6 mi SW of Sta. María del Real, 14°45'N, 86°00'W, *T. Croat & D. Hannon 64117* (CAS, MO).

Central American plants of this species have been treated as *Chaetothylax cuspidatus* D. N. Gibson (Gibson 1974) or *Justicia danielii* L. H. Durkee (Durkee 1999; a new name in *Justicia* for *C. cuspidatus*, not *J. cuspidata* Vahl). Comparison of Central American collections to those of *J. ramulosa* from South America (including an isotype of *Beloperone ramulosa* Morong) reveals that they are similar in every way. Indeed, Lindau annotated the type of *C. cuspidatus* from Guatemala as *Beloperone ramulosa*. South American plants show more variation than was observed among Central American plants in the following characteristics: density of cauline pubescence (trichomes nearly absent to sparse to dense vs. dense), bract shape (ovate to elliptic to obovate vs. obovate), degree of development of aristate bracteal apex (poorly to well developed vs. well developed), and capsule pubescence (glabrous to pubescent vs. pubescent). Some South American plants are indistinguishable from Central American plants in all of these features.

As interpreted here, *J. ramulosa* exhibits an interesting disjunct and amphi-equatorial distribution. At least two other species of Acanthaceae have a similar distribution pattern, occurring in Mexico and southern South America: *Ruellia erythropus* (Nees) Lindau (Ezcurra 1993) and *R. coerulea* Morong (Daniel 1995b).

Pollen of *Croat & Hannon 64117* is 2-aperturate with apertures flanked on each side by 2–3 rows of insulae (Fig. 5g–i). It greatly resembles pollen of *J. ramulosa* from South America (i.e., *Wood 11161* from Bolivia and *Zardini 4585* from Paraguay; Fig. 5h, i). Capsules and seeds, hitherto unknown for Central American representatives of *J. ramulosa*, can be described as follows: capsules 6.5–8 mm long, pubescent with erect to flexuose to retrorse eglandular trichomes 0.05–0.2 mm long, stipe 2–3 mm long, head subellipsoid with a slight medial constriction, 4.5–5 mm long; seeds 4, sublenticular, 1.5–1.9 mm long, 1.4–1.5 mm wide, surfaces and margin covered with trichomelike papillae (pilae and baculae).

**Justicia spicigera** Schltdl.

Phenology. Flowering: April; fruiting: unknown.

Distribution and habitats. Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica; moist thickets; 900 m.

REPRESENTATIVE SPECIMENS. OLANCHO: Quebrada Catacamas cerca de la presa en Montaña Peña Blanca, *A. Molina R. 8346* (EAP, F, NY).

It is possible that this commonly cultivated species is not native in Honduras (although it is so treated here). Because of its uses as a bluing agent in laundering fabric, a blue dye, and a remedy in domestic medicine, it has likely been cultivated for centuries throughout Mexico and Central America. The limits of its native distributional range are not known with certainty.

**Justicia tuxtlensis** T. F. Daniel

Phenology. Flowering: April: fruiting: April.
Distribution and habitats. Mexico, Honduras; moist forests; 200 m.

ATLÁNTIDA: mountain Nombre de Dios between Saladito and San Francisco, *A. Molina R. 20851* (EAP, F, NY).

This species was recently described from the lowland rain forests on the Gulf slope of southeastern Veracruz in Mexico. Herewith, it is reported from Honduras for the first time. In spite of the apparent geographic disjunction in the range of *J. tuxtlensis*, its occurrence in Honduras is not surprising. The Caribbean lowlands in Honduras form a discontinuous portion of the moist to wet lowland formations that extend from southeastern Mexico (i.e., Veracruz) to Panama. The collection noted above agrees with the description provided by Daniel (2002), except that the bracts of a pair vary from only slightly heteromorphic to homomorphic (vs. heteromorphic) and the corollas are noted on the label to be pale yellow (vs. whitish). Pollen of the sole Honduran collection (Fig. 5f) also concurs with Mexican collections of the species (i.e., 3-colporate, 6-pseudocolpate). Additional representative of this species should be sought in the moist to wet forests between the Los Tuxtlas region of Veracruz and northern Honduras.

**Justicia sp. 1**

SANTA BÁRBARA: dry lumbered hillside on hwy San Pedro to Copán at double S curve where it descends rapidly, 168 m, 17 April 1965 (flr, frt), *J. Dickson 1450* (US).

I am unable to associate this collection with a known species of *Justicia* from northern Latin America. It differs from all other Honduran *Justicia* by the following combination of characters: dense, antrorse to antrorsely appressed and ± evenly disposed cauline trichomes; crenate leaf margins; short axillary spikes; triangular bracts 1–2 mm long; equally 5-lobed and glandular pubescent calyces; red-orange and glandular pubescent corollas 21–25 mm long; 2-aperturate pollen (Fig. 5d, e) with apertures flanked by 2 rows of insulae; and glandular pubescent capsules 13.5–16.5 mm long. Whether it represents an undescribed species or one that has been overlooked in recent floristic accounts (e.g., the status of several names and species from southern Mexico has yet to be assessed) remains to be determined. Additional collections from Honduras that resemble this plant are also highly desirable.

**Justicia sp. 2**

ATLÁNTIDA: Campamento Quebrada Grande, ca. 10 km SW of La Ceiba, base of N slope of Pico Bonito, 15°42'N, 86°51'W, 80–100 m, gravel bar along river, moist evergreen forests, 11 May 1993 (flr, frt), *R. Liesner 26190* (EAP, MO).

This collection lacks mature flowers and seeds. It can be distinguished from all other species of *Justicia* in Honduras by the following combination of characters: tawny-colored, antrorse to antrorsely appressed trichomes concentrated in (but not restricted to) two lines; terminal panicles with axillary spikes; heteromorphic bracts at each spike node with one bract obovate to circular, 3–4 mm wide, and subtending a 1-flowered dichasium and with the other bract subulate, less than 0.5 mm wide, and sterile; calyces equally 5-lobed, the lobes with hyaline margins; whitish corollas less than 10 mm long and externally pubescent with eglandular trichomes only; and capsules 7 mm long, pubescent with eglandular trichomes only. Liesner's collection superficially resembles other species with heteromorphic bracts from Mexico and Central America (Wasshausen & Daniel 1995) and four species from southern Central America with axillary and terminal, conspicuously bracteate inflorescences and relatively small corollas (Daniel & Wasshausen 1990). It differs from all of these in characters observable on the two specimens studied, however. Additional collections with mature flowers, pollen, and seeds are needed to fully assess its status.

**Lepidagathis alopecuroidea** (Vahl) R. Br. ex Griseb.

Phenology. Flowering: January–May; fruiting: January–May.

Distribution and habitats. Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Venezuela, Guyana, Surinam, French Guiana, Bolivia, Paraguay, Brazil; moist forests, dry forests, dry thickets; 70–1100 m.

Representative Specimens. Atlántida: Parque Nacional Pico Bonito, ca. 12 km SW of La Ceiba at N base of Cordillera Nombre de Dios, ca. 15°42'N, 86°51'W, *T. Daniel & J. Araque 9509* (CAS, EAP).—El Paraíso: Breñales a lo largo del Río Guayambre, Valle Jamastrán, *A. Molina R. 7354* (EAP, F).—Francisco Morazán: Montaña de La Flor, *C. Byrne 1* (TEFH).—Gracias a Dios: Quebrada Unawas, 3 km NE de Krausirpe, 15°03'N, 84°50'W, *P. House 1812* (CAS, MO, TEFH).—Olancho: ca. 2.5 km above (N) Catacamas on lower slopes of Sierra de Agalta, ca. 14°53'N, 84°54'W, *T. Daniel & G. Pilz 9586* (CAS, EAP).—Yoro: Cordillera Nombre de Dios, ca. 30 km SW of Tela–La Ceiba Hwy between San José de Texíguat and Campo Nuevo, ca. 15°29'N, 87°27'W, *T. Daniel & J. Araque 9492* (CAS, EAP, MO).

**Lophostachys zunigae** C. Nelson

Perennial of unknown height. Young stems subquadrate, bifariously pubescent with flexuose to antrorse to appressed eglandular trichomes to 0.4 mm long, soon glabrate; leaves petiolate, petioles to 30 mm long, blades ovate-elliptic to elliptic, 80–150 mm long, 26–46 mm wide, 3.1–3.6 times longer than wide, reduced in size distally (e.g., to 26 mm long and 5 mm wide and up to 5.2 times longer than wide), acuminate at apex, attenuate at base, abaxial surface pubescent along major veins with eglandular trichomes. Inflorescence of terminal ± pedunculate dichasiate spikes to 55 mm long (including peduncle and excluding flowers), rachis evenly pubescent with upward-pointing eglandular trichomes 0.2–0.7 mm long, dichasia opposite, sessile; bracts ovate to lance-ovate, 9–15 mm long, 2.5–3 mm wide, abaxial surface pubescent like rachis or with trichomes becoming ± appressed, margin ciliate with erect to flexuose eglandular trichomes 0.2–0.8 mm long; bracteoles subulate to lance-subulate, 7.5–12 mm long, 0.4–1 mm wide, abaxial surface pubescent like bracts; flowers sessile. Calyx drying ± straw-colored (and sometimes ± green distally), 21–25 mm long, anterior lobe (next to bract) obovate, 20–25 mm long, 5.1–7 mm wide, 2-lobed at apex (divided 0.06–0.15 its length) with lobes 0.5–3.3 mm long, lateral lobes lance-subulate, 11–12.5 mm long, 0.9–1 mm wide, posterior lobe obovate, 20.5–25 mm long, 6.5–7.6 mm wide, entire, lobes abaxially and marginally pubescent like bracts. Corolla not seen. Stamens not seen. Style 21 mm long, stigma subcapitate, 0.2 mm long. Capsule 11.2–13 mm long, glabrous. Seeds 2.5–4 mm long, 2.5–3.5 mm wide, covered with appressed trichomes.

Phenology. Flowering: April; fruiting: April–May.
Distribution and habitats. Endemic to Honduras; moist forests, 400–800 m.

ATLÁNTIDA: Pico Bonito National Park, Pico Bonito, trail between CURLA camp and first river camp, 15°42'N, 86°51'W, *T. Hawkins 937* (EAP, MO).

*Lophostachys zunigae* is known only from the collection cited above and the type: Atlántida: Quebrada de Oro, Montaña de Búfalo, 20 km SO de La Ceiba, bosque húmedo tropical, 780–1800 m, 3–6 May 1989, *R. Zúniga 453* (holotype: TEFH!; isotypes: EAP! MO! US!). Although the flowers are noted to be light purple on the label of Hawkin's collection at MO and the presence of styles suggest that corollas were recently on the plant collected, corollas are not present on the two specimens examined. The label of *Hawkins 937* at EAP attributes (erroneously) the collection to Cusuco National Park in Cortés on 3 May 1993.

This species differs from all other Mexican and Central American species of *Lophostachys* (Daniel 1993a) by the following combination of character states: calyx 21–25 mm long, the anterior calyx lobe obovate, apically divided less than one-half the length of the lobe, the apical segments 0.5–3.3 mm long; bracteoles subulate to lance-subulate, 7.5–12 mm long; capsules 11.2-13 mm long, glabrous. When corollas and stamens of this species become known, additional distinguishing character states should be sought in these structures.

**Louteridium donnell-smithii** S. Watson

Phenology. Flowering: January–June; fruiting: February–June.
Distribution and habitats. Mexico, Guatemala, Belize, Honduras; wet forests, moist forests, commonly on limestone; 300–1540 m.

REPRESENTATIVE SPECIMENS. COMAYAGUA: Quebrada el Caliche, SE de la Villa Taulabe, *D. Ruiz 138* (NY, TEFH).—COPÁN: Montaña Espiritu Santo, 15°05'N, 88°55'W, *T. Hawkins & D. Mejía 185* (EAP, MO).—CORTÉS: entre Pito Solo y Agua Azul, Lago Yojoa, *A. Molina R. 10619* (EAP, F).—SANTA BÁRBARA: eastern slopes of Cerro Santa Bárbara, *P. Allen et al. 6047* (CAS, EAP, F, GH, US).

**Megaskepasma erythrochlamys** Lindau

This species, presumably native in northern South America, is probably known only from cultivation in Honduras; however, not all collections cited below note that the plants were cultivated.

REPRESENTATIVE SPECIMENS. CHOLUTECA: San Juan Arriba de Corpus, *G. Sandoval AP16* (EAP).—COLÓN: Faust, 4 km N de Sonaguera, *N. Pastor 970* (EAP).—EL PARAÍSO: Santa Cruz, 9 km NO de El Paraíso, *N. Pastor 646* (EAP).—FRANCISCO MORAZÁN: vicinity of El Zamorano, *A. Molina R. et al. 34186* (EAP, MO).

**Mendoncia guatemalensis** Standl. & Steyerm.

Phenology. Flowering: December, April–May; fruiting: December, August.
Distribution and habitats. Mexico, Guatemala, Honduras; wet forests, moist forests; 60–1100 m.

REPRESENTATIVE SPECIMENS. COPÁN: 3 km S of Dulce Nombre de Copán, *L. Williams et al. 42979* (EAP, F, US).—CORTÉS: entre Agua Azul y Pito Solo, Lago de Yojoa, *A. Molina R. 7329* (EAP, F, LL).—OLANCHO: Montaña de Chifiringo, 20 km S de Campamento, *C. Soto 225* (MO, TEFH).—YORO: Camino Real de San José Texíguat a Campo Nuevo en un lugar llamado Las Letras al oeste del Cerro Cabeza de Negro, 15°28'00"N, 87°26'05"W, *R. Aguilar & R. Evans 4071* (CAS, MO).

This species is reported from Honduras for the first time. The three species of *Mendoncia* known from the country can be distinguished by the following key:

1. Corolla entirely red; bracteoles lance-ovate, 3–4 times longer than wide, apically acuminate-falcate, abaxial surface pubescent with trichomes 1–5.5 mm long; drupe pubescent with erect to flexuose eglandular trichomes 0.1–0.8 mm long. *M. lindavii*
1. Corolla whitish with purplish marking; bracteoles elliptic to ovate, 1.3–2.2 times longer than wide, apically rounded to retuse-apiculate to acute-apiculate, abaxial surface glabrous or pubescent with trichomes 0.3–1 (–1.5) mm long; drupe glabrous or mealy-glandular.
   2. Bracteoles 1.6–2.2 times longer than wide, rounded to acute-apiculate at apex, abaxial surface evenly and ± densely pubescent with conspicuous, antrorse to antrorsely appressed trichomes 0.4–1 mm long; drupe 18–23 mm long, 11–15 mm in diameter. *M. guatemalensis*
   2. Bracteoles mostly 1.3–1.6 times longer than wide, retuse-apiculate at apex, abaxial surface glabrous or very sparsely pubescent with a few scattered, antrorsely appressed trichomes 0.2–0.3 mm long or puberulent with inconspicuous, erect trichomes 0.05–0.1 mm long; drupe 14–17 mm long, 7.5–10 mm in diameter. *M. retusa*

**Mendoncia lindavii** Rusby

Phenology. Flowering: April–May; fruiting: April–May.

Distribution and habitats. Belize, Guatemala, Honduras, Costa Rica, Panama, Colombia, Ecuador, Peru, Bolivia; moist forests; 130–200 m.

Atlántida: Parque Nacional Pico Bonito, ca. 12 km SW of La Ceiba at N base of Cordillera Nombre de Dios, ca. 15°42'N, 86°51'W, *T. Daniel & J. Araque 9510* (CAS, EAP, MO, US); Parque Nacional Pico Bonito, base of N slope of Pico Bonito, E of new CURLA (Centro Universitario Regional del Litoral Atlantico) camp building on the Quebrada Grande, ca. 1/3 km above its confluence with the Río Bonito, ca. 10 km SW of La Ceiba, 15°42'N, 86°50'W, *R. Evans 1630* (CAS, EAP, MO, TEFH).—Cortés: Cienaga section [=Agua Azul, fide A. Molina R., pers. comm. 2001] Lake Yojoa, *R. Howard et al. 681* (GH, US).

All known Honduran collections of this species, which is newly reported for the country, are cited above. *Mendoncia lindavii* (Central and South America) superficially resembles *M. hoffmannseggiana* Nees (South America). The two species appear to be distinguishable by the pubescence of the bracteoles and peduncles, which is spreading-villose in *M. lindavii* and appressed-strigose in *M. hoffmannseggiana*.

**Mendoncia retusa** Turrill

Phenology. Flowering: August–December; fruiting: November–March.

Distribution and habitats. Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama; moist forests; sea level to 1010 m.

Representative Specimens. Atlántida: Lancetilla Valley near Tela, *P. Standley 53656* (F, US).—Cortés: quebrada near Agua Azul, *L. Williams & A. Molina R. 11330* (EAP, F).—Gracias a Dios: Las Marías Río Plátano, *R. Tinoco et al. 154* (TEFH).

**Nelsonia canescens** (Lam.) Spreng.

Phenology. Flowering: January; fruiting: March.

Distribution and habitats. Mexico, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, French Guiana, Brazil, Old World; habitat unknown; 1200 m.

Representative specimen. Intibucá: Quebrada Los Naranjos, San Juan, Magdalena, *J. Martínez 359* (MO, TEFH).—Ocotepeque: carretera entre Antigua Ocotepeque y Nueva Ocotepeque, *C. Nelson et al. 1534* (TEFH).

**Odontonema albiflorum** Leonard

Phenology. Flowering: May; fruiting: May.

Distribution and habitats. Mexico, Guatemala, Belize, Honduras; habitats and elevation unknown.

COPÁN: Hac. El Limón to El Paraíso, *S. Blake 7353* (US).

This species was documented from Honduras by Leonard (1936) and is apparently known from there only by Blake's collection made in 1919. Blake noted on the specimen label that the corollas were white with maroon-purple spots on the limb. The Honduran species of *Odontonema* can be identified with the following key:

1. Corolla red.
   2. Dichasia sessile, at least some (usually most) whorled at inflorescence nodes; rachis nearly glabrous or pubescent with appressed eglandular trichomes in lines. *O. tubaeforme*
   2. Dichasia subsessile to pedunculate, at least some (usually most) clearly pedunculate in each inflorescence, opposite at inflorescence nodes; rachis evenly pubescent with erect eglandular trichomes. *O. cuspidatum*
1. Corolla yellow or white with purplish markings on limb.
   3. Inflorescence of dense, unbranched (rarely branched at base), dichasiate spikes or racemes; dichasia mostly whorled at inflorescence nodes; corolla white with purplish markings on limb, externally glabrous. *O. albiflorum*
   3. Inflorescence of open panicles of dichasiate racemes; dichasia opposite at inflorescence nodes; corolla yellow, externally pubescent with glandular and eglandular trichomes. *O. hondurense*

**Odontonema cuspidatum** (Nees) Kuntze

Phenology. Flowering: January, June, September; fruiting: January.

Distribution and habitats. Mexico, Honduras, West Indies; moist forests, moist thickets; 200–1300 m.

REPRESENTATIVE SPECIMENS. COPÁN: near Santa Rita village, *A. Molina R. et al. 33659* (EAP, MO).—CORTÉS: along road between Villa Nueva and Pimienta, *A. Molina R. & A. Molina 34434* (EAP, F, MO).—FRANCISCO MORAZÁN: Quebrada Seca, vicinity of Cerro de Hule, *A. Molina R. & A. Molina 34234* (EAP, MO).

*Odontonema cuspidatum* was previously known from native populations only in Mexico and the West Indies (Daniel 1995c). Standley (1931) and Yuncker (1940) applied this name to plants of *O. tubaeforme* from Atlántida. The species is sometimes cultivated in other tropical regions, including Honduras. Collections from cultivated plants have been made in the departments of Cortés and Francisco Morazán. None of the collections noted above indicate that the plants were cultivated, and they all appear to represent either native or naturalized populations of the species in Honduras. These plants all have the rachis evenly pubescent with short, erect, and eglandular trichomes; the lower dichasia usually pedunculate; and the corolla red with the throat shorter and narrower than in *O. tubaeforme*.

Gibson (1974) included *Odontonema cuspidatum* and *O. tubaeforme*, both red-flowered species, as conspecific with the purple-flowered *O. callistachyum* (Schltdl. & Cham.) Kuntze, and treated this latter species as occurring in Honduras. Daniel (1995c) recognized all three species and indicated that *O. callistachyum* was known from native populations only in Mexico, Belize, and Guatemala. Both *O. cuspidatum* and *O. tubaeforme* are herein treated as native to Honduras, although the former species may be represented in the country only by cultivated and naturalized plants.

**Odontonema hondurense** (Lindau) D. N. Gibson

Phenology. Flowering: October–July; fruiting: October–May.

Distribution and habitats. Belize, Guatemala, Honduras; wet forests, moist forests, along streams; 30–830 (–1680) m.

Representative Specimens. Atlántida: Lancetilla Valley, ca. 3 km up Río Lancetilla from Lancetilla Botanical Garden, ca. 15°44'N, 87°27'W, *T. Daniel & J. Araque 9485* (CAS, EAP, MO, US).—Colón: mountain directly S of Trujillo, *J. Saunders 236* (NY).—Copán: Montaña Espiritu Santo, trail between San Joaquin and Quebrada Grande in Parque Nacional de Cerro Azul, 10.5 km NE of Florida, *T. Hawkins 181* (EAP, MO).—Cortés: Cuyamel, *M. Carleton 457* (US).—Gracias a Dios: alrededores del Río Plátano, dentro de 10 km de la costa Atlántica, 15°30–55'N, 84°40'–85°00'W, *A. Clewell & G. Cruz 4209* (EAP, MO).—Olancho: cerca Río Paulaya, 30 km NNE de Culmí, *R. Keyser 1325* (TEFH).—Yoro: along road from San José de Texíguat to Campo Nuevo in Cordillera Nombre de Dios, ca. 24 km SW of Tela–La Ceiba hwy (#13), ca. 15°31'N, 87°26'W, *T. Daniel & J. Araque 9500* (CAS, EAP, MO, US).

The type of the basionym *Diateinacanthus hondurensis* Lindau is from Honduras: Atlántida: along trail near Bolet's Plantation, Puerto Sierra (=Tela, fide A. Molina R., pers. comm. 2001), 20 Jan 1903, *P. Wilson 129* (holotype: NY, photo! at http://www.nybg.org/bsci/hcol/vasc/Acanthaceae.html). As interpreted here, this species shows considerably more variation in pubescence than was suggested by Daniel (1995c). For example, the inflorescence rachises vary from virtually glabrous (e.g., *Clewell & Cruz 4209*) to inconspicuously puberulent (e.g., *Liesner 26409*, CAS) to conspicuously pubescent (e.g., *Hawkins 181*). *Hawkins 181* is also unusual in its exceptionally long (to 27 mm long) corollas and its occurrence at 1680 m elevation. *Odontonema hondurense* can be distinguished from other species of *Odontonema* in Honduras by its yellow corollas, which are externally pubescent. Pollen (Fig. 2d, e) of this species is 3-colporate and 6-pseudocolpate, as in most of its Mesoamerican congeners.

**Odontonema tubaeforme** (Bertol.) Kuntze

Phenology. Flowering: throughout the year; fruiting: December–August.

Distribution and habitats. Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, Panama; wet forests, moist forests, dry forests, moist thickets, cafetales, along streams; 20–1600 m.

Representative Specimens. Atlántida: base of N slope of Pico Bonito, E of new CURLA camp on Quebrada Grande, ca. 10 km SW of La Ceiba, 15°42'N, 86°51'W, *R. Evans 1589* (EAP).—Colón: Trujillo, edge of Río Negro, *A. Clewell et al. 4315* (EAP, MO).—Comayagua: Río Frío, ca. 2 km NE de La Libertad, 14°46'N, 87°35'W, *J. Linares et al. 2322* (EAP).—Copán: ca. 1.5 km W of Santa Rita on road from Copán, *J. Poole & W. Watson 948* (LL).—Cortés: ca. 3 km beyond Cofradia toward Cusuco National Park, ca. 15°25'N, 88°10'W, *T. Daniel & J. Araque 9622* (CAS, EAP, K, MO, US).—El Paraíso: Montaña Apauhis, cerca de Danlí, *A. Molina R. 7444* (EAP).—Gracias a Dios: orilla del Río Mocorón, aldea de Mocorón, *C. Nelson & E. Vargas 5094* (CAS, MO).—Intibucá: Quebrada de Pelón de Guise, *A. Molina R. 6407* (EAP, F, LL).—Lempira: Parque Nacional de Celaque, summit trail from visitor center to Las Minas, ca. 14°33 34'N, 88°38–40'W, *T. Daniel & J. Araque 9886* (CAS, EAP).—Olancho: ca. 2.5 km above (N) Catacamas on lower slopes of Sierra de Agalta, ca. 14°53'N, 84°54'W, *T. Daniel & G. Pilz 9588* (CAS, EAP, MO).—Santa Bárbara: ca. 9 km SW of Peña Blanca, in wash near Los Laureles and along road to 2 km beyond toward El Higuerón, ca. 14°56'N, 88°04'W, *T. Daniel & J. Araque 9613* (CAS, EAP).—Yoro: Río Guaimas (Guayman) on hwy between Progresso and Tela, 15°30'N, 87°40'W, *G. Davidse et al. 34384* (EAP).

Unlike plants in El Salvador, which tend to confound *O. tubaeforme* and *O. glaberrimum* (M. E. Jones) V. M. Baum (Daniel 2001), those from Honduras generally share the distinctions seen in Mexican plants of *O. tubaeforme* noted by Daniel (1995c): whorled and sessile dichasia, rachis nearly glabrous or pubescent with appressed eglandular trichomes in lines, corolla red and shaped like those of the Mexican ones.

**Pachystachys lutea** Nees

This native of Peru is known only from cultivation in Honduras.

Representative Specimens. Comayagua: La Libertad, *Z. Caballero 138* (TEFH).—Copán: Copán Ruinas, *A. Molina R. & A. Molina 34304* (EAP).—El Paraíso: Las Dificultades, 10 km S de El Paraíso, *N. Pastor 855* (EAP).—Francisco Morazán: El Zamorano, Escuela Agrícola Panamericana, *A. Molina R. 27202* (EAP, F).

**Poikilacanthus macranthus** Lindau

Phenology. Flowering: April–May; fruiting: April–May.

Distribution and habitats. Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama; cloud forests, moist forests, along streams; (600–) 1400–2200 m.

Representative Specimens. Cortés: Sierra de Merendón, Montaña del Carmen, *T. Pérez E. s.n.* (EAP).—El Paraíso: Planes de Cifuentes, 80 km E de Danlí, *C. Nelson & R. Andino 10309* (TEFH).—Gracias a Dios: alrededores del Río Plátano, ca. 25 km de la costa, W de Buena Vista, 15°40'N, 85°00'W, *A. Clewell & G. Cruz 4206* (EAP, MO).—Olancho: Agalta Natl. Park, trail between La Chorrera campsite and La Picucha summit, *W. D'Arcy 18064* (CAS, EAP, MO).—Santa Bárbara: eastern slopes of Cerro Santa Bárbara, *P. Allen et al. 6058* (EAP, F).

Variation in pubescence among collections of this species was noted by Daniel (1991a). The more conspicuously pubescent form of the species, formerly treated as *P. setiferus* Standl. & Steyerm., is represented by *Pérez E. s.n.* from Cortés. The lower elevation limit is an estimate based on locality data from *Clewell & Cruz 4206* and topographic maps of the region.

**Pseuderanthemum alatum** (Nees) Radlk.

Phenology. Flowering: September; fruiting: unknown.

Distribution and habitats. Mexico, Guatemala, Honduras, Nicaragua; moist forests; 600 m.

Representative Specimens. Olancho: orillas Quebrada El Ocote, 14 km NE de Juticalpa, *G. Adolfo Torres 48* (MO, TEFH).

**Pseuderanthemum carruthersii** (Seem.) Guillaumin

This species, purportedly native to Polynesia, is probably known only from cultivation in Honduras (although not noted as such on specimen labels).

Atlántida: La Unión, Ceiba, *D. Velásquez D. 121* (NY, TEFH).—Cortés: Aldea Tulián, 5 km W de Puerto Cortés, *S. Muñoz 125* (TEFH).—El Paraíso: Aldea El Chichicaste, *J. Sánchez Ch. 126* (TEFH).—Francisco Morazán: Nueva Armenia, *O. Méndez 123* (TEFH).—Valle: Amapala, *J. Valerio R. 3351* (EAP, F, RSA).—Yoro: 2 km N de Progreso, *R. Guevara 141* (TEFH).

**Pseuderanthemum cuspidatum** (Nees) Radlk.

Phenology. Flowering: May, August–December (chasmogamous), September–March (cleistogamous); fruiting: September–December.

Distribution and habitats. Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Venezuela, Ecuador; cloud forests, moist thickets, along streams; 500–1600 m.

Representative Specimens. Comayagua: El Resumidero, 4 km W de La Laguna, *B. Holst 1351* (EAP).—Cortés: Montaña de La Nieve, 20 km S de San Antonio de Cortés, *C. Nelson et al. 7902* (CAS, MEXU, MO).—El Paraíso: Mpio. El Paraíso, camino de El Paraíso a Las Dificultades, *J. Linares et al. 4022* (EAP, MEXU).—Lempira: faldas de Montaña Puca entre Guatán y Cuábanos, *A. Molina R. 12944* (EAP).—Olancho: Río Wampú, NE de Culmí, *C. Nelson & A. Clewell 694* (EAP, MO).—Yoro: Río Pijol Valley, 6–7 km S of Nueva Esperanza, 15°12'N, 87°35'W, *R. Liesner 26599* (CAS, EAP, MO, TEFH).

Plants with only budlike, cleistogamous flowers, plants with chasmogamous flowers (e.g., corollas to 30 mm long), and plants with flowers intermediate between these extremes (e.g., corollas ca. 10 mm long) are evident among Honduran representatives of this species. Cleistogamous-flowered individuals of *Pseuderanthemum* have been treated as various species of *Buceragenia* Greenm. (Daniel 1995a).

**Pseuderanthemum liesneri** T. F. Daniel, sp. nov.—TYPE: HONDURAS. Atlántida: Campamento Quebrada Grande, ca. 10 km SW of La Ceiba, base of N slope of Pico Bonito, from camp to 2 km S of camp, Río Bonito, 15°42'N, 86°51'W, 80–140 m, edge of forest next to cacao plantation, 14 May 1993, *R. Liesner 26343* (holotype: CAS!; isotypes: EAP, MEXU! MO! TEFH). Fig. 8.

Frutices usque ad 1.5 m alti. Folia brevi-petiolata, laminae subcoriaceae, ellipticae. Flores in paniculam racemoideam terminalem dispositi, rhachides puberulae trichomatibus eglandulosis, minus quam 0.05 mm longis; dichasia opposita, sessilia vel subsessilia, uniflora, solitaria axilla. Flores pedicellati. Calyx 1.3–1.5 mm longus. Corolla lavandula, 9–11.5 mm longa, extus puberula trichomatibus glandulosis et eglandulosis.

Shrubs to 1.5 m. Young stems ± evenly and minutely puberulent with erect eglandular trichomes less than 0.05 mm long. Leaves petiolate, petioles to 12 mm long, blades subcoriaceous, elliptic, 99–205 mm long, 33–73 mm wide, 2.6–3.7 times longer than wide, subacuminate to acuminate at apex, rounded to acute at base, surfaces appearing ± glabrous but with at least midvein minutely puberulent, margin entire to subsinuate, midvein canaliculate on adaxial surface. Inflorescence a terminal panicle of racemes, rachises minutely puberulent; dichasia opposite, sessile to subsessile (i.e., borne on peduncles to 0.2 mm long), 1-flowered, 1 per axil. Bracts triangular-subulate to subulate, 0.9–1.5 mm long, abaxial surface pubescent with erect to antrorse eglandular trichomes to 0.05 mm long. Bracteoles triangular to subulate, 0.5–1.1 mm long, abaxial surface pubescent like bracts. Flowers pedicellate, pedicels 1.5–2.2 mm long. Calyx 5-lobed, 1.3–1.5 mm long, lobes 0.8–1 mm long, abaxially puberulent like bracts. Corolla lavender, 9–11.5 mm long, externally puberulent with erect glandular and eglandular trichomes to 0.05 mm long, tube 5–6 mm long, sometimes ± expanded distally for 1–2 mm into a throat, limb 7–9 mm in diameter, upper lip 3.5–4.5 mm long, lobes 3.2–3.6 mm long, 2–2.2 mm wide, lower lip 4–5.5 mm long, lobes 3.9–4.2 mm long, 2.5–3 mm wide. Stamens exserted, 4.5–5.2 mm long, thecae 0.8–1.2 mm long, subequally inserted, subequal in size; pollen oblate-spheroidal to subprolate, 3-colporate, 6-pseudocolpate; staminodes 0.3–0.5 mm long, sometimes with rudimentary thecae. Style 2–3 mm long, sparsely pubescent proximally, stigma subcapitate, 2-lobed, less than 0.1 mm long. Ovary pubescent with antrorse eglandular trichomes. Capsule and seeds not seen.

Phenology. Flowering: May, November; fruiting: unknown.

Distribution and habitats. Endemic to northern Honduras (Atlántida); moist forests; 100–300 m.

PARATYPE. ATLÁNTIDA: Jilamito Viejo, 4.5 km S of Jilamito Nuevo, 15°30'N, 87°34'W, *P. Maas et al. 8497* (MO).

There is neither a worldwide account of *Pseuderanthemum* nor a treatment of the North American, Central American, or South American species. *Pseuderanthemum liesneri* does not conform to Colombian species treated by Leonard (1958) and

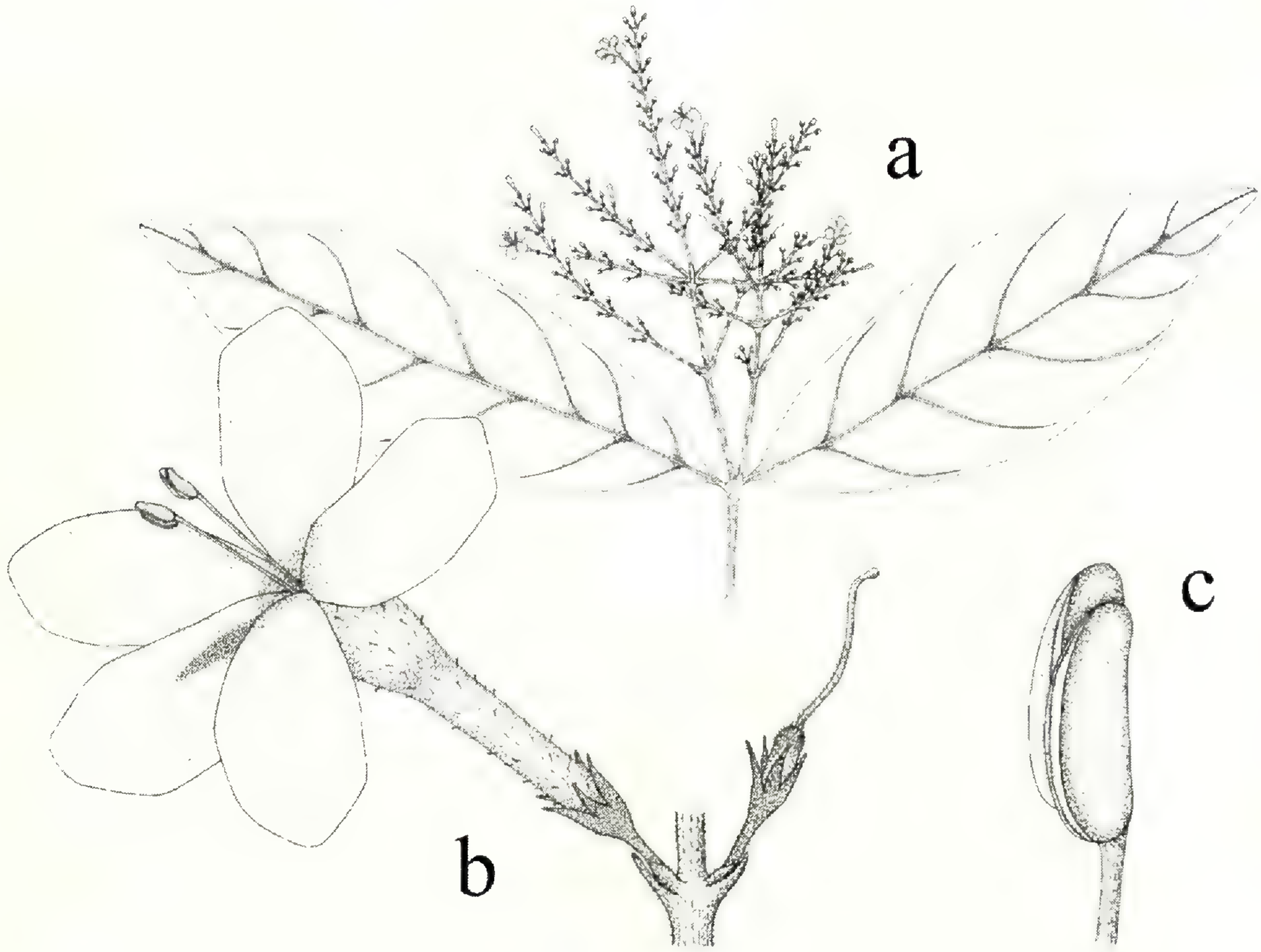


FIG. 8. *Pseuderanthemum liesneri* (*Liesner 26343*). a. Branch with inflorescences, ×0.45. b. Inflorescence node with flower (left) and calyx + gynoecium after dehiscence of corolla (right), ×5.5. c. Apex of stamen with anther, ×23. Drawn by Jennifer Kane.

differs from all other Mexican and Central American species of the genus by its small calyces (1.3–1.5 vs. 1.5–12 mm long) and chasmogamous corollas (9–11.5 vs. 15–45 mm long). Among Mesoamerican species, it superficially resembles *P. verazpazense*, which also occurs in Honduras (see below), but can be distinguished from that species by the following couplet:

Herbs to 6 dm tall; young stems with at least some internodes bifariously pubescent with flexuose to recurved trichomes 0.1–0.8 mm long; calyx 2.5–4 mm long, abaxially pubescent with glandular and eglandular trichomes; corolla (16–) 18–35 mm long; stamens included in corolla tube; style 13–20 mm long. *P. verapazense*

Shrubs to 1.5 m tall; young stems ± evenly puberulent with erect trichomes less than 0.05 mm long; calyx 1.3–1.5 mm long, abaxially pubescent with eglandular trichomes only; corolla 9–11.5 mm long; stamens exserted from mouth of corolla; style 2.6–3 mm long. *P. liesneri*

The androecial and gynoecial distinctions noted above may reflect different floral forms of heterostylous species. Heterostyly has been noted among various species of *Pseuderanthemum* (Daniel 1995b), but it has not been reported in *P. verapazense*. If *P. liesneri* is heterostylous, then the two known collections represent the "thrum" form. Cleistogamous flowers, which are also frequent among species of *Pseuderanthemum* (Daniel 1995a), were not observed on the collections of *P. liesneri*. Pollen of *P. liesneri* (Fig. 2h, i) resembles that reported for other Mexican and Central American species (Daniel 1998).

**Pseuderanthemum praecox** (Benth.) Leonard

Phenology. Flowering: November, February–May; fruiting: March–May.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica; cloud forests, evergreen montane forests, pine-oak forests, pine forests, meadows and along streams, secondary shrubby vegetation; 1050–2430 m.

Representative Specimens. Comayagua: Barranco de Trincheras [ca. 20 km N of Siguatepeque], *L. Williams & A. Molina R. 12530* (EAP).—Francisco Morazán: near Hoya Grande, *L. Williams & A. Molina R. 10996* (EAP).—Intibucá: Banos Las Piletas, La Esperanza, *A. Molina R. 6211* (EAP).—La Paz: Montaña Verde on Cordillera Guajiquiro, *A. Molina R. & A. Molina 24359* (EAP, F, NY).—Lempira: Parque Nacional de Celaque, ca. 7 km W of Gracias, summit trail, 14°33–34'N, 88°38–40'W, *T. Daniel & J. Araque 9861* (BR, CAS, EAP, K, MO, MICH, TEFH, US).—Ocotepeque: Reserva Biológica Guisayote, SE slope of Cerro Cocal, along trail ca. 100 m N of Santa Rosa de Copán–Nueva Ocotepeque hwy, ca. 13 km E of Nueva Ocotepeque, 14°28'N, 89°05'W, 2010 m, *R. Evans 1541* (EAP, MO).

Daniel (1995b) tentatively recognized both *Pseuderanthemum fasciculatum* (Oerst.) Leonard and *P. praecox* in Chiapas, Mexico. Salvadoran plants were treated as *P. fasciculatum* (Daniel 2001). Examination of Honduran collections referable to these taxa reveals that plants conforming to *P. praecox* differ from those conforming to *P. fasciculatum* only by lacking leaves. All Honduran (and Salvadoran) plants are here considered to belong to a single species, *P. praecox*, until such time as the taxonomy of this genus has been fully studied and resolved. Honduran plants of *P. praecox* differ from those of *P. cuspidatum* by their generally longer and glandular calyx.

**Pseuderanthemum verapazense** Donn. Sm.

Phenology. Flowering (cleistogamous) April; fruiting: April.

Distribution and habitats. Mexico, Guatemala, Belize, Honduras; riverine forests; 265–360 m.

Santa Bárbara: Los Dragos, on Río Chamelecón SW of Quimistán, *P. Standley & H. Lindelie 7364* (EAP, F).

The sole collection representing the occurrence of this species in Honduras lacks chasmogamous flowers, but otherwise resembles specimens of this species occurring to the west of Honduras (described in Daniel 1995b). This represents the first report of *P. verapazense* in Honduras.

**Ruellia coerulea** Morong

Phenology. Flowering: May; fruiting: unknown.

Distribution and habitats. Mexico (presumably native), Bolivia, Brazil, Paraguay, Uruguay, Argentina and widely cultivated/naturalized in the Western Hemisphere; moist forests; sea level to 700 m.

Representative Specimens. Atlántida: El Naranjo, Las Mangas, *M. R. M. 29* (TEFH).—Islas de la Bahía: Roatán, Flowers Bay, *C. Nelson 2067* (TEFH).—Santa Bárbara: Lago de Yojoa, W shore near El Rincón, *S. Blackmore & M. Chorley 3695* (MO).

The Honduran collections of *R. coerulea* represent cultivated (e.g., *Nelson 2067*) and possibly naturalized plants. Daniel (1995b) discussed the taxonomy and distribution of this species, which has often been treated as *R. brittoniana* Leonard.

**Ruellia fulgida** Andr.

Phenology. Flowering: January–May; fruiting: May.

Distribution and habitats. Honduras, Nicaragua, Panama, Colombia, Venezuela, West Indies; moist forests and thickets, cafetales; 600–900 m.

Olancho: Catacamas, Montañas de Murmuyo, Sierra de Agalto, *S. Blackmore & G. Heath 1944* (MO); ca. 2.5 km above (N) Catacamas on lower slopes of Sierra de Agalta, ca. 14°53'N, 84°54'W, *T. Daniel & G. Pilz 9587* (CAS, EAP); Quebrada Catacamas cerca de la presa en Montaña Peña Blanca, 900 m, 28 April 1957, *A. Molina R. 8343* (lectotype of *R. molinae* D. N. Gibson, here designated: F!; isolectotype: EAP!); faldas del Cerro El Boquerón, 20 km NE de Juticalpa, *J. Segovia 178* (MO, TEFH); trail between Catacamas and La Presa, N of Catacamas, *P. Standley 18675* (EAP).—Yoro: near Puente Grande, on a tributary of the Río Agua (Río Puente Grande), *S. Blackmore & M. Chorley 4061* (MO).

All of the Honduran specimens studied are cited above. In the protologue of *Ruellia molinae*, Gibson (1973) indicated that the type was *Molina 8343* at F and EAP. Because she annotated the specimen at F as the holotype in 1972, it is designated as the lectotype of the species. Gibson (1973) compared *R. molinae* to *R. pereducta* Standl. ex Lundell, to which it appears closely related; however, *R. molinae* is indistinguishable from *R. fulgida,* and the name *R. molinae* is here included in the synonymy of that species. This pair of superficially similar species, *R. pereducta* and *R. fulgida*, can be distinguished in Honduras by the characters in the following couplet:

Axillary dichasia with flowers crowded into a headlike cluster at distal end of peduncle (when secondary peduncles rarely present, these arising from a headlike cluster and terminating in another headlike cluster); peduncles, abaxial surface of calyx lobes, and capsules conspicuously (and often ± densely) pubescent; corolla red; Honduras to South America. *R. fulgida*

Axillary dichasia conspicuously expanded between flowers (i.e., conspicuous secondary peduncles present and flowers not crowded into headlike clusters); peduncles, abaxial surface of calyx lobes, and capsules glabrous or with sparse and inconspicuous trichomes; corolla pink or pinkish purple; Mexico, Guatemala, Belize. *R. pereducta*

Whether these differences are better reflective of distinctions at the specific level (as treated here) or infraspecific variation that is largely correlated with geographic distribution remains a matter of conjecture at present.

**Ruellia geminiflora** H. B. K.

Phenology. Flowering: March–July, October; fruiting: March–December.

Distribution and habitats. Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil, Paraguay, Argentina; oak forests, pine forests, savannas, wet pastures, brushy slopes, along streams, disturbed areas; 350–1100 m.

Representative Specimens. Comayagua: Siguatepeque, *J. Valerio R. 2654* (EAP, F).—Copán: ca. 18 km NE of Copán on road to San Pedro Sula, *J. Poole & W. Watson 994* (LL).—Cortés: Río Armentas, *C. Thieme 5396* (CAS, US).—El Paraíso: below Guayabillas, near Quebrada Jagua, *A. Molina R. 652* (EAP).—Francisco Morazán: grounds of Escuela Agrícola Panamericana in El Zamorano, ca. 14°01'N, 87°01'W, *T. Daniel 9466* (CAS, EAP).—Lempira: Celaque National Park, ca. 7 km W of Gracias, ca. 14°34'N, 88°38'W, *T. Daniel & J. Araque 9625* (CAS, EAP).—Olancho: road to Las Lomas, NE of Catacamas, *P. Standley 18473* (EAP).—Yoro: ca. 5 km SE of Nueva Esperanza, ca. 15°16'N, 87°34'W, *T. Daniel & J. Araque 9519* (CAS, EAP, MO, US).

Nelson (1986) ascribed numerous medicinal attributes to this species, including use as an emetic and as a remedy for pneumonia, dysentery, jaundice, and intestinal obstructions.

**Ruellia harveyana** Stapf

Phenology. Flowering: April; fruiting: May.

Distribution and habitats. Mexico, Guatemala, Belize, Honduras; wet forests; elevation unknown.

Representative Specimens. Colón: path to Río Negro Dam, 1.5 mi SE Trujillo, *J. Saunders 208* (NY).—Gracias a Dios: Río Plátano, *A. Clewell 4206* (TEFH).

**Ruellia hookeriana** (Nees) Hemsl.

Phenology: Flowering and fruiting throughout the year.

Distribution and habitats. Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua; pine forests, pine-oak forests, thickets, along streams, pastures; 360–1600 m.

Representative Specimens. Choluteca: Mpio. San Marcos de Colón, El Aguacate, ca. 3 mi S of San Francisco, 13°21'N, 86°54'W, *G. Davidse et al. 35070* (EAP, MO).—Comayagua: Valle Comayagua, entre Las Mercedes y Villa de Flores, *A. Molina R. 14372* (EAP).—Copán: Yaragua Creek, 1 mi W of Copán Ruinas, *A. Molina R. & A. Molina 30866* (EAP, F, MO).—Cortés: San Pedro Sula, *T. Pérez E. s.n.* (EAP).—El Paraíso: 15 km N of Yuscarán, *L. Williams & A. Molina R. 18218* (EAP, F).—Francisco Morazán: near El Jicarito, toward Pedregal, *P. Standley 20856* (EAP, F).—Intibucá: Quebrada Santiago, ca. 24.5 km SW of Siguatepeque toward Jesús de Otoro near SW base of Sierra de Montecillos, ca. 14°31'N, 87°59'W, *T. Daniel & J. Araque 9642c* (CAS, K, EAP, MO, US).—Ocotepeque: Quebrada Tinasa, between Sinuapa and La Providencia, *A. Molina R. 22391* (EAP, F).—Olancho: Mpio. La Unión, ca. 10 mi E of La Unión on road to Olanchito, ca. 15°03'N, 86°35'W, *G. Davidse et al. 35070* (EAP).—Santa Bárbara: Los Dragos, on Río Chamelecón, SW of Quimistán, *P. Standley & H. Lindelie 7419* (EAP, F).—Yoro: Aguán River valley, vicinity of Coyoles, above village of Los Flores, *T. Yuncker et al. 8143* (F, MO, NY).

Considerable variation is evident in vegetative pubescence of this species. Densely pubescent plants from Honduras have been treated as a distinct species, *R. williamsii* Leonard [type: Francisco Morazán: drainage of the Río Yeguare, ca. 14°N and 87°W, near Las Mesas, 900 m, barranco in pine-oak forest, 11 July 1948, *L. Williams 14187* (holotype: US!)]. Leonard (1950) noted that *R. williamsii* is very closely related to *R. hookeriana* and that additional studies might show it to be merely a form of that species. He distinguished *R. williamsii* on the basis of its densely pilose younger stems, smaller (up to 4 cm long and 2 cm wide vs. mostly 5–6 cm long and 3 cm wide) leaf blades, and somewhat longer (15 mm long vs. ca. 10 mm long) calyx segments. All of the measurements noted by Leonard for the putative distinctions are encompassed by specimens of *R. hookeriana* from Chiapas, Mexico (Daniel 1995b). Thus, *R. williamsii* is herewith included in the synonymy of *R. hookeriana*. *Davidse et al. 35478* from Olancho differs from other individuals of *R. hookeriana* by its linear-oblanceolate (vs. subulate) calyx lobes.

**Ruellia inundata** H. B. K.

Phenology. Flowering: November–May; fruiting: November–May.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Ecuador, Brazil; moist thickets, dry thickets, dry forests, thornscrub, along streams, disturbed areas; 110–1400 m.

Representative Specimens. Choluteca: vicinity of San Marcos de Colón, *P. Standley 15789* (EAP, F).—Comayagua: Mpio. Villa de San Antonio, entre Villa de San Antonio y Ciudad de La Paz, ca. 3 km NE de Villa de San Antonio, 14°21'N, 87°37'W, *J. Linares et al. 2305* (EAP).—Cortés: Manacal Ranch, *J. Dickson 1148* (US).—El Paraíso: Río Choluteca near Ojo de Agua, *L. Williams & A. Molina R. 12727* (EAP).—Francisco Morazán: Río Yeguare near San Francisco, ca. 5 km S of El Zamorano, ca. 13°58'N, 86°59'W, *T. Daniel & J. Araque 9443* (CAS, EAP, K, MO, US).—Intibucá: Quebrada Santiago near SW

base of Sierra de Montecillos, ca. 24.5 km SW of Siguatepeque toward Jesús de Otoro, ca. 14°31'N, 87°59'W, *T. Daniel & J. Araque 9642b* (CAS, EAP).—La Paz: between Sadagua River and Llano San Antonio, *A. Molina R. 24127* (EAP, F).—Ocotepeque: entre Antigua Ocotepeque and Nueva Ocotepeque, *C. Nelson et al. 1498* (EAP).—Olancho: between Juticalpa and La Concepción, *P. Standley 17926* (EAP, F).—Santa Bárbara: along river ca. 1 km E of Santa Bárbara, ca. 14°55'N, 88°14'W, *T. Daniel & J. Araque 9621* (CAS, EAP, MO, US).—Valle: vicinity of Amapala, Isla Tigre, *P. Standley 20733* (NY, US).—Yoro: between Olanchito and Yoro, ca. 5 km E of Arenal, ca. 15°23'N, 86°51'W, *T. Daniel & J. Araque 9516* (CAS, EAP).

Variation in color of the corollas has been noted elsewhere for this species (Daniel 1995b). In Honduras, most plants have pink corollas, but both lavender and white corollas have been noted on herbarium labels.

**Ruellia malacosperma** Greenm.

Phenology. Flowering: September–November, May–June; fruiting: September–November, June.

Distribution and habitats. Mexico, cultivated and/or naturalized in other regions; moist thickets, dry forests; 10–950 m.

Representative Specimens. Comayagua: vicinity of Siguatepeque (cultivated), *P. Standley & J. Chacón P. 6641* (F).—Cortés: between Villa Nueva and Pimienta toward San Pedro Sula, *A. Molina R. & A. Molina 34428* (EAP, F, MO).—Francisco Morazán: Colonia Las Colinas, Tegucigalpa, *A. Molina R. 33853* (EAP).—Valle: Amapala, *J. Valerio R. 3362* (EAP, F, UC).

This species is commonly cultivated in warm regions, including Honduras. On the label of *Molina R. 33853*, from a ravine in Tegucigalpa, it is noted that the plants had probably escaped from cultivation. It remains to be determined whether the species is native or naturalized in Honduras, but the latter status seems more likely, and it is so treated here. The taxonomic status (e.g., whether it is distinct from *R. coerulea*) and origins (e.g., whether it is a hybrid) of this species have been widely speculated upon (e.g., Turner 1991; Daniel 1995b).

**Ruellia matagalpae** Lindau

Phenology. Flowering: January–May; fruiting: January–May.

Distribution and habitats. Mexico, Guatemala, Belize, Honduras, Nicaragua; moist forests, oak forests, second growth along rivers; 100–750 m.

Representative Specimens. Comayagua: quebrada El Caliche, vicinity of Taulabé, *A. Molina R. & A. Molina 31668* (EAP, F, MO).—Cortés: SW of Lake Yojoa near Punta Gorda, *P. Allen 6470* (EAP, F, GH, US). —Islas de la Bahía: Roatán, camino de French Harbour a Six Huts, *A. Oviedo 129* (F).—Olancho: lower slopes of Sierra de Agalta, 3–5 km above (N) of Catacamas, ca. 14°53'N, 85°54'W, *T. Daniel & G. Pilz 9599* (CAS, EAP, MO).—Santa Bárbara: Punta Gorda, Lago Yojoa, 14°53'N, 88°00'W, *R. Evans 1025* (EAP, MO).

**Ruellia metallica** Leonard

Phenology. Flowering: April; fruiting: January, April.

Distribution and habitats. Guatemala, El Salvador, Honduras, Costa Rica, Panama; moist forests; 50–120 m.

Representative specimens. Atlántida: Lancetilla Valley, ca. 3 km up Río Lancetilla from Lancetilla Botanical Garden, ca. 15°44'N, 87°27'W, *T. Daniel & J. Araque 9482* (CAS, EAP, K, MICH, MO, US).—Gracias a Dios: Cerro de Colón, 1 km S de Krausirpe, 15°03'N, 84°50'W, *P. House 1856* (TEFH).

This is the first report of this species from Honduras.

**Ruellia nudiflora** (Engelm. & A. Gray) Urb.

Phenology. Flowering: November, March, June–August; fruiting: November–August.

Distribution and habitats. U.S.A., Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama, West Indies; deciduous forests, thickets, disturbed areas; 60–830 m.

Representative Specimens. Comayagua: 1 km a Comayagua, *A. Molina R. 14264* (EAP).—Copán: between Acropolis and Jaguar Temple of Copán Ruinas, *A. Molina R. 26250* (EAP, F, MO, NY, US).—Cortés: San Pedro Sula, *A. Molina R. & A. Molina 34332* (EAP).—Francisco Morazán: finca in Agua Blanca, ca. 5 km SW of Talanga, ca. 14°24'N, 87°07'W, *T. Daniel & G. Pilz 9605* (CAS, EAP, MO, US).—Olancho: waste ground in Catacamas, *T. Daniel & G. Pilz 9589* (CAS, EAP, MO).—Yoro: Mpio. Olanchito, 20 mi W of Olanchito on road to Yoro, 15°27'N, 86°43'W, *G. Davidse et al. 35520* (CAS, EAP, MO).

Among Honduran collections, this name has often been applied to plants treated here as *Ruellia puberula* (see below).

**Ruellia paniculata** L.

Phenology. Flowering: February–April; fruiting: February–April.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, West Indies, Colombia, Venezuela, Brazil; moist lake shores, thickets; 8–640 m.

Representative Specimens. Choluteca: 14 km SO Choluteca, *E. Repulski 643* (EAP).—Comayagua: El Banco, J. *Valerio R. 2375* (EAP, F).—Cortés: Río Lindo to Potrerillos, *L. Williams & A. Molina R. 17861* (EAP, F, US).

**Ruellia puberula** (Leonard) Tharp & F. A. Barkley

Phenology. Flowering: April–October; fruiting: throughout the year.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras; moist forests, moist thickets, dry thickets, arid scrub, disturbed areas; 500–1800 m.

Representative Specimens. Comayagua: Valle Comayagua entre Las Mercedes and Villa de Flores, *A. Molina R. 14358* (EAP).—Copán: La Florida to Hac. Esperitu Santo, *S. Blake 7401* (US).—Cortés: Lago de Yojoa, Isla de Venado, *M. García 86* (NY).—El Paraíso: alrededores de El Rodeo, ca. 10 km S de Yuscarán, *J. Linares & R. Metsger 1671* (EAP).—Francisco Morazán: Río Guarabuquí, terrenos de los indios Xicaques de la Montaña de La Flor, *A. Molina R. 3027* (EAP, F).—Intibucá: above Río Otoño, *F. Barkley & J. Hernández R. 40416* (GH).—La Paz: vicinity of La Paz, *P. Standley 24991* (EAP).—Olancho: Rancho Quemado, *W. Gillis 9602* (US).

*Ruellia puberula* was treated as a variety of *R. nudiflora* by Leonard (1927), and most Honduran collections of it have been identified as the latter species. Honduran collections of *R. puberula* differ from those of *R. nudiflora* by the characters in the following couplet:

Plants prostrate or procumbent; leaves mostly 13–45 mm long and 5–20 mm wide; inflorescence of long-pedunculate, eglandular dichasia from leaf axils above the base of the plant, a terminal glandular inflorescence absent; corolla externally pubescent with eglandular trichomes (or if glandular trichomes present, then these few and inconspicuous); capsules varying from entirely pubescent with eglandular trichomes (sometimes with glands at the apex) to pubescent only in the distal half and mostly lacking apical glands. *R. puberula*

Plants erect; leaves mostly 35–125 mm long and 17–45 mm wide; inflorescence of 1) basal, long-pedunculate, and eglandular or sparsely glandular dichasia, 2) a terminal, glandular inflorescence, and 3) laterally spreading, mostly glandular dichasia between the basal and terminal inflorescence; corolla externally pubescent with glandular and eglandular trichomes, the glands conspicuous; capsules entirely pubescent and including glandular trichomes (at least at apex). *R. nudiflora*

**Ruellia standleyi** Leonard

Phenology. Flowering: unknown; fruiting: May.

Distribution and habitats. Guatemala, Honduras, Nicaragua, Costa Rica; moist forests; 700 m.

Representative Specimens. Olancho: Mata de Maíz, O de Montaña Punta de Piedra, 30 km NE de Culmí, *C. Nelson & E. Vargas 2743* (MO, TEFH).

This distinctive species with crenate leaf margins, a densely glandular terminal inflorescence, greenish corollas, and linear-ellipsoid capsules has not been reported previously from Honduras.

**Ruellia tuberosa** L.

Phenology. Flowering: September; fruiting: April, August–September.

Distribution and habitats. West Indies, Colombia, Venezuela, Peru, naturalized in tropical regions worldwide; gardens and waste places; near sea level.

Representative Specimen. Atlántida: Tela, ca. 15°47'N, 87°28'W, *T. Daniel & J. Araque 9489* (CAS, EAP, MO, US).

This species is apparently both cultivated and naturalized in Honduras. *Daniel & Araque 9489* was naturalized in waste ground in Tela, whereas another collection from Tela (*Nelson 7781*, US) was collected from the patio of a house. Plants of this species typically produce both cleistogamous and chasmogamous flowers.

**Sanchezia parvibracteata** Sprague & Hutch.

This native of southern Central America and northern South America is likely known only from cultivation in Honduras.

Representative Specimens. Comayagua: Siguatepeque, *J. Valerio R. 2725* (EAP, F).—Francisco Morazán: vicinity of El Zamorano, *P. Standley 28490* (EAP).

A collection (*Rodríguez 192*, CAS, MO) from Montaña La Tigra in Francisco Morazán was not noted to have been cultivated and might represent a naturalized individual or population.

**Spathacanthus hahnianus** Baill.

Phenology. Flowering: August–September; fruiting: March.

Distribution and habitats. Mexico, Guatemala, Honduras; moist forests; 900–2300 m.

Representative Specimens. Cortés: 2 km NW de la quebrada de Cantiles, 15°32'N, 88°15'W, *C. Nelson et al. 16631* (TEFH).—Lempira: Parque Nacional Montaña de Celaque, Cerro Aguacatal, Las Chimis, San Manuel Colohete, *P. House et al. 185* (EAP).—Yoro: ca. 16 km from Yarucha [=Yaruca?] on Quebrada de Oro to Cerro Búfalo, *W. Holmes 4392* (NY, TEX).

*Spathacanthus hahnianus* was reported from Honduras by Daniel (1999b), who also provided a key to the three known species of the genus. These rare trees (to 12 m tall according to *House et al. 185*) and shrubs remain poorly known in Honduras. *House et al. 185* lacks corollas but likely represents this species.

**Stenandrium chameranthemoideum** Oerst.

Phenology. Flowering: March–May; fruiting: March–April.

Distribution and habitats. Mexico, Honduras; moist forests; 1200–1500 m.

Representative Specimens. Comayagua: Barranco Trincheras, ca. 20 km N of Siguatepeque, *A. Molina R. 1368* (EAP), *6964* (EAP, F), *A. Molina R. & A. Molina 25477* (EAP, F), *L. Williams & A. Molina R. 12517* (EAP), *18059* (EAP).

This is the first report of this species in Honduras and Central America. All five known Honduran collections of *S. chameranthemoideum* come from the same locality and are cited above. The Honduran plants differ from those in Mexico only by the young stems with antrorsely appressed (vs. erect to flexuose to retrorse) trichomes.

**Stenandrium pedunculatum** (Donn. Sm.) Leonard

Phenology. Flowering: June–November; fruiting: June–November.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Nicaragua; pine forests, moist forests, along streams, grassy slopes; 800–1100 m.

Representative Specimens. Choluteca: near El Banquito, *L. Williams & A. Molina R. 10796* (EAP, F, US).—El Paraíso: Río Lizapa, Llano de Lizapa, *A. Molina R. 3955* (EAP, F, MO, US).—Francisco Morazán: near San Francisco, drainage of Río Yeguare, 14°N, 87°W, *A. Molina R. 218* (EAP, F, GH).

**Stenostephanus hondurensis** T. F. Daniel, sp. nov.—Type: Honduras. Copán: El Paraíso, Cerro Azul, 15°06'N, 88°55'W, 1700 m, bosque montano, 8 Mar 2000, *L. Zelaya & S. Laínez 336* (holotype: TEFH!). Fig. 9.

Perennis. Folia petiolata, laminae ellipticae, 120–175 mm longae, 36–70 mm latae, 2.5–3.4-plo longiores quam latiores. Inflorescentia thyrsi, rachis pubescens trichomatibus eglandulosis, dichasia pedunculata (1–) 3-flora, flores pedicellati. Corolla rubra, 17–18 mm longa, extus pubescens, labium superiorus 7–9 mm longum, labium inferiorus 8–11 mm longum lobis 2–4.5 mm longis. Capsula ignota.

Perennials of unknown height. Young stems subterete to subquadrate, ± evenly pubescent with antrorsely appressed eglandular trichomes 0.2–0.4 mm long, soon glabrate. Leaves petiolate, petioles to 25 mm long, blades elliptic, 120–175 mm long, 36–70 mm wide, 2.5–3.4 times longer than wide, acuminate at apex, attenuate at base, surfaces with antrorse eglandular trichomes, trichomes ± restricted to major veins, margin entire, ciliate. Inflorescence a terminal thyrse to 110 mm long (including peduncle), peduncle and rachis ± flattened to ridge-angled, evenly pubescent with erect to flexuose eglandular trichomes 0.05–0.2 mm long; dichasia opposite, (1–) 3-flowered, pedunculate, peduncles 1.5–2.5 mm long, pubescent like rachis. Bracts triangular-subulate, 1–1.2 mm long, 0.4–0.5 mm wide, abaxial surface pubescent like rachis or with the trichomes becoming ± antrorse. Bracteoles linear to triangular-subulate, 0.6–0.8 mm long, 0.2 mm wide, pubescent like bracts. Flowers pedicellate, pedicels 2.5–4 mm long, pubescent like rachis, lateral flowers borne on secondary peduncles 1.5–2 mm long. Calyx 1.5–2 mm long, abaxially pubescent with erect to antrorse eglandular trichomes to 0.05 mm long, lobes triangular-subulate, 1.2–1.5 mm long, subequal in length, 0.6–0.8 mm wide. Corolla linear to ± c-shaped in bud, red, 17–18 mm long, externally pubescent with erect to antrorse eglandular trichomes 0.05–0.1 mm long, tube 6–8 mm long, ± gradually expanded distally forming a ± distinguishable throat, narrow proximal portion 3.5–4 mm long, throat 3–4.5 mm long, 3–3.2 mm in diameter, widest near midpoint, upper lip straightforward to spreading, 7–9 mm long, 2 mm wide, lower lip 3-lobed, 8–11 mm long, lobes 2–4.5 mm long, 0.9–1.4 mm wide. Stamens inserted near base of corolla tube (in proximal 1/3), 16–17 mm long, thecae red, 3.2–3.8 mm long; pollen (Fig. 10c) globose-spherical, 2-porate, surface of

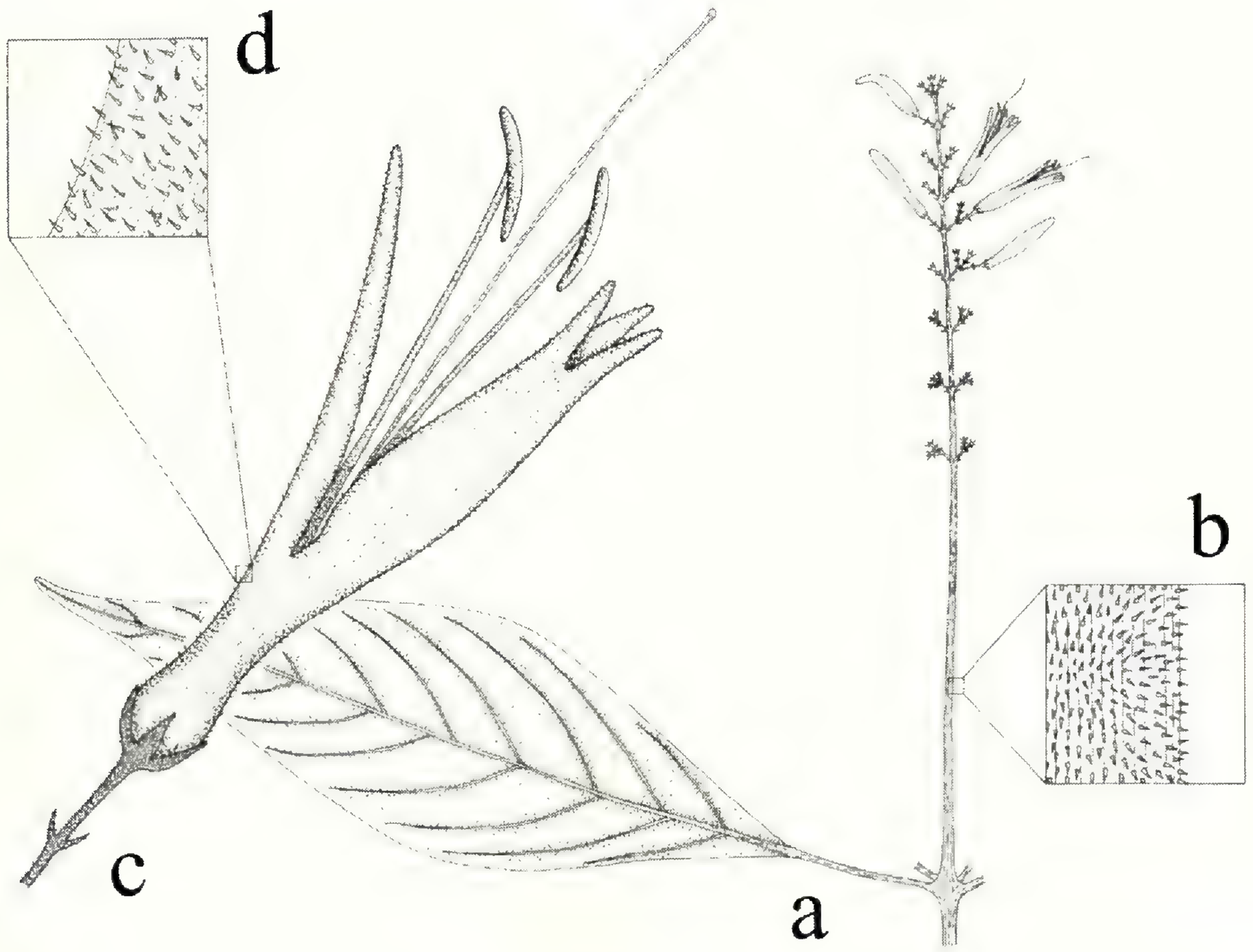


FIG. 9. *Stenostephanus hondurensis* (*Zelaya & Laínez 336*). a. Leaf and inflorescence, ×0.5. b. Detail of inflorescence peduncle showing pubescence, ×5.6. c. Portion of floral peduncle, bracteoles, pedicel, and flower, ×3.7. d. Detail of pubescence on external surface of corolla, ×19. Drawn by Jennifer Kane.

circular regions densely baculate to gemmate, peripheral band apparently continuous, baculate to gemmate. Style red, 20–22 mm long, glabrous, stigma 0.1 mm long, minutely 2-lobed. Ovary glabrous. Capsule and seeds not seen.

Phenology. Flowering: March; fruiting: unknown.

Distribution and habitats. Endemic to western Honduras; montane forests; 1700 m.

*Stenostephanus* Nees is a neotropical genus with about 75 species occurring from Mexico to Bolivia. This represents the first report of the genus in Honduras. It can be distinguished from other Honduran genera of Acanthaceae by the following combination of characters: cystoliths present, two stamens with 1-thecous anthers, and 2-porate pollen divided into two gemmate regions by a continuous or interrupted peripheral band. Species of *Stenostephanus* usually have very restricted distributions, and they tend to occur in cloud forests at relatively high elevations.

*Hansteinia* Oerst. and *Habracanthus* Nees are now treated as congeneric with *Stenostephanus* (Daniel 1995a, 1999a; Wasshausen 1999), but many of the nomenclatural combinations for Central American species have yet to be made. Daniel (1999a) revised the Mexican species; the Central American species are currently being studied. *Stenostephanus hondurensis* does not conform to any of the 24 currently recognized species of these genera from Mexico and Central America nor does it appear to be conspecific with South American taxa (Leonard 1958; Wasshausen 1999; Wasshausen & Wood 2001; Wood 1988). Superficially, it resembles *Habracanthus ruberrimus* D. N. Gibson from Guatemala by its more or less flattened to ridge-angled inflorescence peduncles and rachises, its red corollas, and generally similar pollen (Fig. 10c–e). That

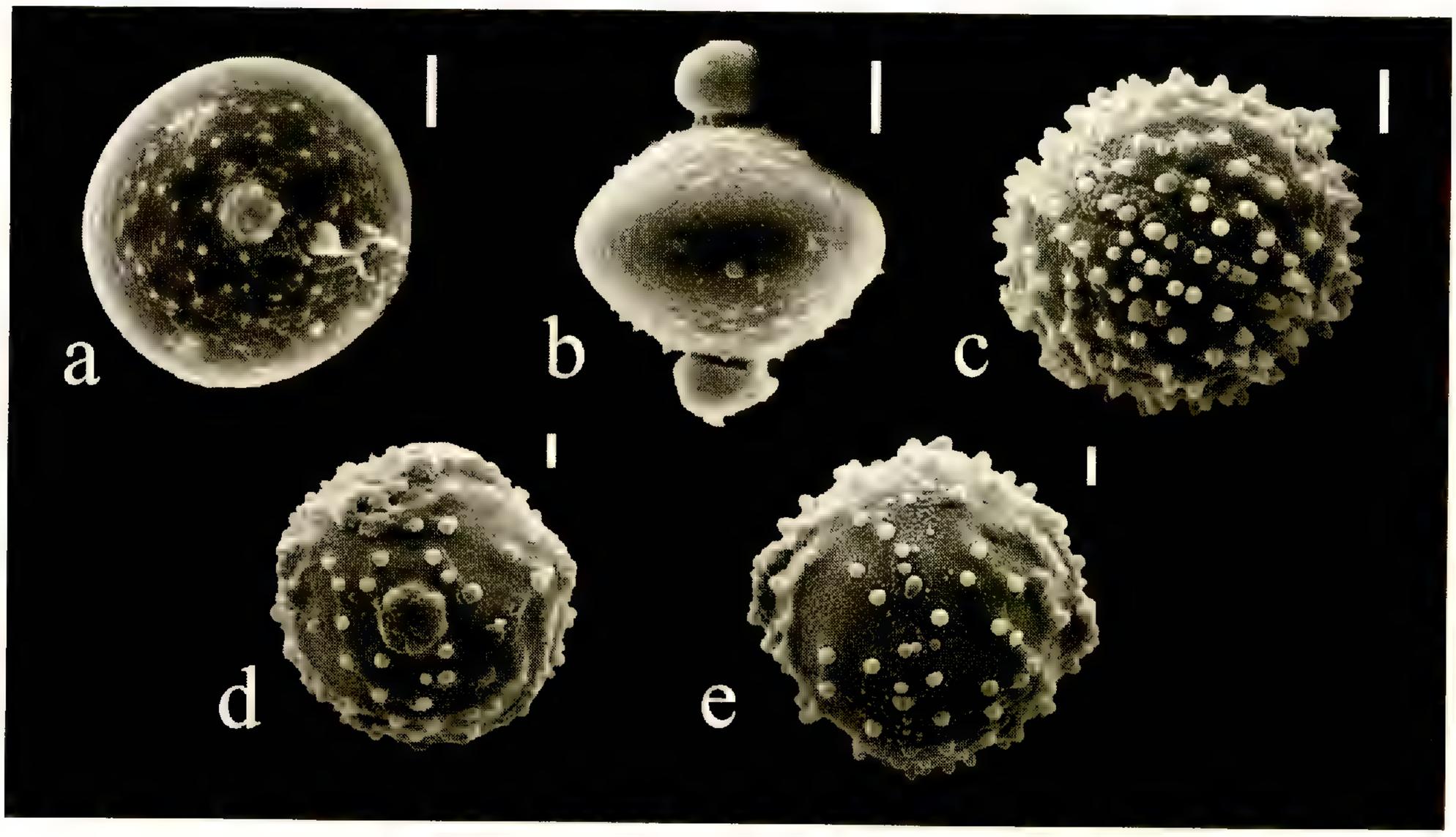


FIG. 10. Pollen of *Stenostephanus*. a. *S. sessilifolius* (*Liesner 26675*), apertural view. b. *S. sessilifolius* (*Liesner 26675*), interapertural view. c. *S. hondurensis* (*Zelaya & Laínez 336*), interapertural view. d. *S. ruberrimus* (*Contreras 6621* from Guatemala), apertural view. e. *S. ruberrimus* (*Contreras 6621*), interapertural view. Scale bar: = 5 μm.

species differs from *S. hondurensis* by its inconspicuously bifariously pubescent rachis with antrorse to antrorsely appressed trichomes, dichasia borne on peduncles 3–13 mm long, subulate bracts 1.5–3.5 mm long, calyx 5–6 mm long and abaxially glabrous, and corolla 25–36 mm long with the external surface covered with papillae less than 0.05 mm long.

**Stenostephanus sessilifolius** (Oerst.) T. F. Daniel, comb. nov. *Glockeria sessilifolia* Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1854: 141. 1855.*Galeottia sessilifolia* (Oerst.) Kuntze, Revis. gen. pl. 2: 490. 1891. *Hansteinia sessilifolia* (Oerst.) Durkee, Fieldiana, Bot. (n.s.) 18: 44. 1986.—TYPE: COSTA RICA. Heredia: "in monte Barba," 6000 ft, May 1847, *A. Oersted 10659* (holotype: C!).

Phenology. Flowering: May; fruiting: May.
Distribution and habitats. Honduras, Costa Rica; along streams; 1300–1500 m.

YORO: Río Pijol Valley, 7 km SE of Nueva Esperanza, 15°12'N, 87°35'W, *R. Liesner 26675* (EAP, MO).

A new combination in *Stenostephanus* is proposed for the species most recently treated as *Hansteinia sessiliflora* (Durkee 1986). Wood (1988) and Daniel (1995a) discussed the relationships of these and other genera with two monothecous stamens and biporate pollen.

This represents the first report of this species in Honduras. In late April of 2000, I was unsuccessful in relocating the population from which the only known Honduran collection was made in the region southeast of Nueva Esperanza. Morphological characters evident on Liesner's specimens fall within the range of variation observed on specimens of *S. sessilifolius* from Costa Rica, although they tend to have more

trichomes on the rachis and peduncles of the inflorescence. Label data on Liesner's collection describe the corollas as orange. Most plants of *S. sessilifolius* have corollas that are red dorsally and yellow ventrally. Corollas on some collections from Costa Rica (e.g., *Koptur SK-92*) are sometimes described as "orange-red," when it is evident (even from the dried corollas) that they are red dorsally and yellow ventrally. In their dried state, it is not possible to determine the color of the corollas from the sole Honduran specimens. Pollen of *S. sessifolius* from Honduran plants (Fig. 10a, b) concurs with that of Costa Rican plants.

The two species of *Stenostephanus* in Honduras can be distinguished using the following couplet:

Inflorescence peduncles and rachis evenly pubescent; bracteoles linear to triangular-subulate, 0.6–0.8 mm long; calyx 1.5–2 mm long; corolla externally pubescent; thecae 3.2–3.8 mm long; pollen with peripheral band baculate to gemmate. *S. hondurensis*

Inflorescence peduncles and rachis glabrous to bifariously pubescent; bracteoles subulate, 1–1.7 (–2.5) mm long; calyx 5–13.5 mm long; corolla externally glabrous; thecae 2.5–3 mm long; pollen with peripheral band psilate to subpsilate. *S. sessilifolius*

**Tetramerium nemorum** Brandegee

Phenology. Flowering: February–May; fruiting: May.

Distribution and habitats. Mexico, Guatemala, El Salvador, Honduras, Nicaragua; dry forests, thornscrub, along streams; 350–690 m.

Representative Specimens. Comayagua: vicinity of Comayagua, *P. Standley & J. Chacón P. 5911* (EAP, F).—El Paraíso: road between Yuscarán and Oropolí, 10–14 km N of Oropolí, ca. 13°55'N, 86°48'W, *T. Daniel et al. 9569* (CAS, EAP, K, MO, US).—Francisco Morazán: ca. 21 km SE of Talanga along road to Villa de San Francisco, ca. 14°14'N, 87°01'W, *T. Daniel & G. Pilz 9606* (CAS, EAP, K, MEXU, MICH, MO, UPS).

The type of the taxonomic synonym, *Averia melanosperma* Leonard, is from Honduras: El Paraíso, thicket along Choluteca River near Ojo de Agua, 559 m, 1 Feb 1947, *L. Williams & A. Molina R. 14050* (holotype: US!; isotype: F!).

**Tetramerium nervosum** Nees

Phenology. Flowering: January–February, May; fruiting: January–February, May.

Distribution and habitats. U.S.A., Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Ecuador, Peru; dry forests, thornscrub, disturbed areas, along streams; 110–1200 m.

Representative Specimens. Choluteca: El Escudo, 4.5 km W de San Francisco, *C. Nelson 1364* (EAP).—El Paraíso: vicinity of Río California, between Río Choluteca and Jacalapea, *P. Standley 29163* (EAP, F).—Francisco Morazán: grounds of Escuela Agrícola Panamericana in El Zamorano, S of live-stock sheds, ca. 14°01'N, 87°01'W, *T. Daniel 9549* (CAS, EAP, MO, US).—Valle: Gulf of Fonseca, Tiger Island, 1838, *A. Sinclair s.n.* (type of *T. polystachyum* Nees: holotype: K!).

Daniel (1986) equated *T. polystachyum* with *T. nervosum*. Plants resembling the type of the former name have since been recollected on Isla Tigre (e.g., *P. Standley 20700* at NY and US). Sinclair's type specimen represents one of the first known plants to have been collected in Honduras (Nelson 1990, 1996).

**Thunbergia alata** Bojer ex Sims

Phenology. Flowering: throughout the year; fruiting: July–September, December–April.

Distribution and habitats. Africa, naturalized throughout the tropics; gardens, disturbed areas, beaches; 0–1600 m.

Representative Specimens. Atlántida: 8.1 km S of La Ceiba near Río Cangrejal on road to Yaruca, *T. Daniel & J. Araque 9514* (CAS, EAP, MO, US).—Choluteca: vicinity of San Marcos de Colón, *P. Standley 15701* (EAP, F).—Colón: Trujillo, *A. Clewell et al. 4282* (EAP, MO).—Comayagua: vicinity of Siguatepeque, *P. Standley & J. Chacón P. 6635* (F).—Copán: 10 mi W of Copán toward La Entrada, *T. Croat 42513* (MO).—Cortés: vicinity of La Lima, *P. Standley & J. Chacón P. 7193* (F).—El Paraíso: El Paraíso, *A. Molina R. 27207* (EAP, F, US).—Francisco Morazán: Zamorano, *J. Valerio R. 3543* (EAP, F, US).—La Paz: vicinity of Marcala town, Marcala River, *A. Molina R. & A. Molina 24277* (EAP, F, NY).—Lempira: Cd. Gracias, ca. 14°25'N, 88°35'W, *C. Nelson et al. 320* (MO).—Ocotepeque: vicinity of Nuevo Ocotepeque, Sinuapa River, *A. Molina R. 22160* (EAP, F, NY).—Olancho: Campamento, *I. Guerra C. 112* (MO).—Santa Bárbara: alrededores de Santa Bárbara, Río Ulúa, *A. Molina R. 3804* (EAP, F, GH, US).—Yoro: near Progresso, *P. Standley 55008* (F, US).

This species is both cultivated and naturalized in Honduras.

**Thunbergia erecta** (Benth.) T. Anderson

This native of western tropical Africa is known only from cultivated plants in Honduras.

Representative Specimens. Atlántida: Tela, *A. Molina R. & A. Molina 34698* (EAP).—Colón: Faust, 4 km N de Sonaguera, *N. Pastor E. 972* (EAP).—Francisco Morazán: Zamorano, *J. Valerio R. 2242* (EAP, F).

**Thunbergia fragrans** Roxb.

Phenology. Flowering: December–February, May, August; fruiting: December–February, May.

Distribution and habitats. India, naturalized in many tropical regions; gardens, disturbed areas; 40–1000 m.

Representative Specimens. Atlántida: near Lancetilla, *T. Yuncker 5017* (F, NY).—Comayagua: Agua Caliente, vaguada de Río Chamo y Río Humuya, *C. Nelson et al. 6447* (MEXU, MO).—Cortés: 5 km de San Pedro Sula, Río Arenales, El Sauce, *A. Molina R. 3827* (EAP, F, GH, US).—El Paraíso: vicinity of Danlí, *P. Standley 16681* (EAP, F).—Francisco Morazán: Cementerio General, Comayagüela, *C. Sherman 152* (NY).—La Paz: alrededores de La Paz, *M. Medina 230* (MO).—Yoro: near Mindanao, *J. Dickson 911* (EAP).

This species is both cultivated and naturalized in Honduras.

**Thunbergia grandiflora** Roxb.

Phenology. Flowering: November–May, August; fruiting: unknown.

Distribution and habitats. India through southeastern Asia, cultivated and naturalized in tropical regions; gardens, disturbed areas; 80–800 m.

Representative Specimens. Atlántida: Lancetilla Experiment Station, *T. Yuncker 5030* (NY).—Choluteca: aldea Las Delicias, 20 km N de Choluteca, *J. Segovia 40* (MEXU).—El Paraíso: outskirts of Danlí, *N. Harriman 14586* (MO).—Francisco Morazán: El Zamorano, *A. Molina R. & A. Molina 34795* (EAP, MO).—Olancho: vicinity of Juticalpa, *P. Standley 18084* (EAP).

This species is cultivated and reputedly naturalized (e.g., *Standley 18084*) in Honduras. Some cultivated plants from El Zamorano (e.g., *Valerio R. 1097, 2289*, both at EAP) have narrow leaves lacking large marginal teeth (they also have coarsely and irregularly sinuate margins and three major veins). They are suggestive of *Thunbergia laurifolia* and may represent that species.

## Excluded Names

The following names have been cited from Honduras in one or more sources. They are excluded based on the reasons provided.

*Aphelandra aurantiaca* var. *stenophylla* Standl. = narrow-leaved form of *Aphelandra aurantiaca* Lindl. (Daniel, 1991b, and see above).

*Aphelandra deppeana* Schltdl. & Cham. = *Aphelandra scabra* (Vahl) Sm. (Daniel 1991b).

*Aphelandra repanda* Nees = narrow-leaved form of *Aphelandra aurantiaca* (Daniel 1991b and see above).

*Asystasia coromandeliana* Nees = *Asystasia gangetica* T. Anderson (Fosberg et al. 1993).

*Averia longipes* (Standl.) Leonard = *Tetramerium nemorum* Brandegee (Daniel 1986).

*Averia melanosperma* Leonard = *Tetramerium nemorum* (Daniel 1986).

*Barleria micans* Nees = *Barleria oenotheroides* Dum. Cours. (Daniel 1995a).

*Beloperone guttata* Brandegee = *Justicia brandegeana* Wassh. &. L. B. Sm. (Daniel 1989).

*Beloperone variegata* Lindau.—This name is a synonym of *Justicia chamaephyton* D. N. Gibson (Daniel 1993b), a species known only from southern Costa Rica. Molina's (1975) inclusion of it among Honduran Acanthaceae was likely based on a misidentification.

*Beloperone violacea* Planch. & Linden.—This name was applied to plants collected from the Gulf of Fonseca by Hemsley (1882), who also noted the taxonomic synonym, *Justicia carthagenensis* Jacq. If these two names do indeed apply to the same species, then the correct name for it in *Justicia* is *J. carthagenensis*.

*Blechum brownei* Juss. = *Blechum pyramidatum* (Lam.) Urb. (Daniel 1995a).

*Buceragenia glandulosa* Leonard = *Pseuderanthemum cuspidatum* (Nees) Radlk. (Daniel, 1995b, and see above).

*Carlowrightia costaricana* Leonard = *Carlowrightia arizonica* A. Gray (Daniel 1995b).

*Chaetothylax rothschuhii* Lindau = *Justicia micrantha* (Oerst.) V. A. W. Graham (see above).

*Crossandra undulaefolia* Salisb. = *Crossandra infundibuliformis* (L.) Nees (Bailey 1949).

*Dicliptera assurgens* (L.) Juss. = *Dicliptera sexangularis* (L.) Juss. (Daniel 1995b).

*Dicliptera brachiata* Spreng.—This name applies to a species of the southern United States and northern Mexico. Molina's (1975) inclusion of it from Honduras was based on a misidentification.

*Dicliptera sumichrasti* Lindau.—See above under *Dicliptera antidysenterica* A. Molina R.

*Dicliptera vahliana* Nees = *Dicliptera sexangularis* (Daniel 1995b).

*Dyschoriste hondurensis* Leonard = *Dyschoriste quadrangularis* (Oerst.) Kuntze (see above).

*Dyschoriste oaxacensis* Kobuski = *Dyschoriste capitata* (Oerst.) Kuntze (Daniel 1995b).

*Dyschoriste skutchii* Leonard = *Dyschoriste capitata* (Daniel 1995b).

*Eranthemum nervosum* (Vahl) R. Br. ex Roem. & Schult. = *Eranthemum pulchellum* Andr. (Fosberg et al. 1993).

*Fittonia argyroneura* Coem. = *Fittonia albivenis* (Lindl. ex Veitch) Burmmitt (Brummitt 1980).

*Henrya scorpioides* (L.) Nees.—Although this name is commonly applied to plants of *H. insularis* Nees ex Benth., its basionym pertains to *Dicliptera sexangularis* (Daniel 1990).

*Hygrophila conferta* Nees = *Hygrophila costata* Nees (Daniel 1995b).

*Hygrophila guianensis* Nees = *Hygrophila costata* (Daniel 1995b).

*Hypoestes sanguinolenta* Hook. f.—This name is commonly misapplied to *Hypoestes phyllostachya* Baker (Daniel 1995b).

"*Jacobinia pohliana* var. *velutina* Hort. "—This "name" was cited by Molina (1975). I find no evidence for its publication.

*Jacobinia spicigera* (Schltdl.) L. H. Bailey = *Justicia spicigera* Schltdl. (Daniel 1995b).

*Jacobinia umbrosa* (Benth.) Blake = *Justicia aurea* Schltdl. (Daniel 1995b).

*Justicia chamaephyton* D. N. Gibson.—This species of southern Costa Rica is not known from Honduras. Molina's (1975) inclusion of it was based on a misidentification.

*Justicia corynimorpha* D. N. Gibson = *Justicia carthagenensis* Jacq. (Daniel 1995b).

*Justicia fulvicoma* Schltdl.—See above under *Justicia ciriloi* T. F. Daniel.

*Justicia olanchana* Standl. & L. Williams, nomen nudum—Although listed by Molina (1975), this manuscript name was never published; plants so annotated are *Justicia ramulosa* (Morong) C. Ezcurra.

*Justicia peckii* (S. F. Blake) Standl. = *Justicia breviflora* (Nees) Rusby (Daniel 1995b).

*Justicia tinctoria* (Oerst.) D. N. Gibson = *Justicia colorifera* V. A. W. Graham (Daniel 1995b).

*Justicia trichotoma* (Kuntze) Leonard.—See above under *Justicia pilzii* T. F. Daniel.

*Justicia tuerckheimiana* Donn. Sm. = *Justicia candelariae* (Oerst.) Leonard (Daniel 1995b).

*Mendoncia costaricensis* Oerst.—Standley (1931) used this name for plants from the Lancetilla Valley, and Molina (1975) included it in his list of Honduran Acanthaceae. A Standley collection from Lancetilla at F that was labeled with this name is *Mendoncia retusa* Turrill. *Mendoncia costaricesis* is not known from Honduras.

*Nelsonia brunelloides* (Lam.) Kuntze—Although this name has often been used in referring to plants treated above as *Nelsonia canescens* (Lam) Spreng., Barker (1986) indicated that its basionym pertains to *Hemigraphis*.

*Odontonema callistachyum* (Schltdl. & Cham.) Kuntze.—Not known from Honduras; see above under *O. cuspidatum* (Nees) Kuntze.

*Odontonema paniculiferum* S. F. Blake.—Yuncker (1940) used this name for plants from Atlántida. It was included in the synonymy of *Odontonema hondurense* (Lindau) D. N. Gibson by Daniel (1997).

*Poikilacanthus setiferus* Standl. & Steyerm. = *Poikilacanthus macranthus* Lindau (Daniel 1991a, and see above).

*Pseuderanthemum atropurpureum* (W. Bull) Radlk. = *Pseuderanthemum carruthersii* (Seem.) Guillaumin (Daniel 1995b).

*Razisea spicata* Oerst.—*Standley 14158* (F), supposedly collected from moist pine-oak forest at 1600 m at Monte Oscuro in the department of Francisco Morazán, has written across the label, "mixed label, this plant may not be from Honduras." Lacking additional confirmation of the presence of this species in Honduras, it is excluded from the acanthaceous flora of the country. As noted above, it might be expected to occur there in moist forests.

*Ruellia brittoniana* Leonard = *Ruellia coerulea* Morong (Daniel 1995b).

*Ruellia campestris* (Oerst.) Hemsl.—This name, based on a fragmentary collection from Costa Rica and not treated by Durkee (1986), has been applied to plants from Honduras. Honduran specimens determined with this name (e.g., *Gillis 9602* at US) are treated here as *Ruellia puberula*.

*Ruellia latibracteata* D. N. Gibson = *Blechum grandiflorum* Oerst. (see above).

*Ruellia molinae* D. N. Gibson = *Ruellia fulgida* Andr. (see above).

*Ruellia williamsii* Leonard = *Ruellia hookeriana* (Nees) Hemsl. (see above).

*Siphonoglossa hondurensis* Standl. & Steyerm. = *Justicia ramosa* (Oerst.) V. A. W. Graham (see above).

*Siphonoglossa ramosa* var. *hondurensis* (Standl. & Steyerm.) Hilsenb. = *Justicia ramosa* (see above).

*Siphonoglossa sessilis* (Jacq.) D. N. Gibson.—See above under *Justicia ramosa*.

*Teliostachya alopecuroidea* (Vahl) Nees = *Lepidagathis alopecuroidea* (Vahl) R. Br. ex Griseb. (Daniel 1995b).

*Tetramerium polystachyum* Nees = *Tetramerium nervosum* Nees(Daniel 1986).

*Thunbergia alba* S. Moore.—Molina (1975) listed this name for cultivated acanthaceous plants, probably in reference to white-flowered individuals of *T. alata* Bojer ex Sims.

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# ELEOCHARIS IGNOTA (CYPERACEAE), A NEW SPECIES FROM WESTERN MEXICO

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ABSTRACT. Eleocharis ignota S. González & Reznicek (Cyperaceae), previously described as E. montevidensis Kunth forma angustior, is elevated to the rank of species. Its differences with E. montevidensis and E. dombeyana are discussed.

RESUMEN. Eleocharis ignota S. González et Reznicek (Cyperaceae), previamente tratada como E. montevidensis Kunth forma angustior, es reconocida a nivel de especie. Se comentan sus diferencias con E. montevidensis y E. dombeyana.

During 1991 and 1992, while revising sedges for the upcoming volume of the *Flora Novo-Galiciana*, Rogers McVaugh found an unknown element of *Eleocharis* that was provisionally named "*E. ignota*." He asked Socorro González-E. for her opinion regarding this novelty and invited her to describe it. After collecting more material in Jalisco and reviewing a number of specimens of the complex surrounding *E. montevidensis* Kunth, González-E. concluded, with considerable doubts, that "*E. ignota*" could represent only a regional form of the variable and widely distributed *E. montevidensis* and described it as *E. montevidensis* forma *angustior* S. González & McVaugh (McVaugh 1993). The epithet for the forma reflects the shape of the spikelets, which are longer and relatively narrower than those of other populations of *E. montevidensis*.

Recent studies on *Eleocharis* subseries *Truncatae* from Mexico reveal that the name *E. montevidensis* has been broadly applied to a complex of species, and that *E. montevidensis* forma *angustior* represents one of these. Therefore, this taxon is elevated to the rank of species.

**Eleocharis ignota** S. González & Reznicek, sp. nov. *Eleocharis montevidensis* forma *angustior* S. González & McVaugh, Flora Novo-Galiciana 13: 362. 1993.—TYPE: MEXICO. Jalisco: 22 km de Lagos de Moreno, por la carretera a Guadalajara, en charcos, 12 Aug 1992, *S. González 5249* with *A. García y L. López* (holotype: CIIDIR!; isotypes: ANSM! CHAP! CHAPA! ENCB! IBUG! IEB! MEXU! MICH! NMSU!). Figs. 1, 2.

Caespitose perennial from a hard, ligneous rhizome covered by remains of older culm bases (usually the rhizome absent in herbarium specimens and the clumps appearing to arise from a vertical or ascending caudex). Culms erect, 20–44 cm long, 0.4–1 mm wide, rectangular to subterete and strongly flattened, with 3–4 blunt ridges on each of the wide sides, flattened or subterete at summit. Basal sheaths membranous, easily disintegrating, purple at the base, the apex oblique, rounded, the mouth

FIG. 1. *Eleocharis ignota*. Habit of flowering plant, showing the coarse rhizome (*S. González 5249*; holotype).

rounded or v-shaped; upper sheath 2.4–5 cm long, tight, cylindrical, pale green or purple, the apical margin reddish, thickened; truncate, with an erect subulate fragile cusp (0.5–) 0.8–2 mm long, 0.1–0.2 mm wide at the base. Spikelets lanceoloid to ellipsoid (ovoid when immature), 9–13 mm long, 1.8–3.5 mm thick, usually acute to narrowly acute, less often obtuse, ca. (35–) 70–160-flowered; floral scales 1.7–2.1 mm long, 0.8–1.2 mm wide, polystichous, appressed, narrowly ovate to narrowly elliptic, obtuse to acute, the midvein stramineous or reddish, laterally membranous, dark purple to almost black, the margins and apex scarious, colorless, gradually translucent, with one or two horizontal wrinkles near the apex; the two lowermost scales sterile, the lowermost amplexicaulous, 1.8–2 mm long, 1.6–2 mm wide, the median part green and up to 1.2 mm wide, appearing to be a continuation of the culm, the margins and apex scarious, colorless, translucent, wrinkled, the apex 0.8–1.1 mm long, rounded to

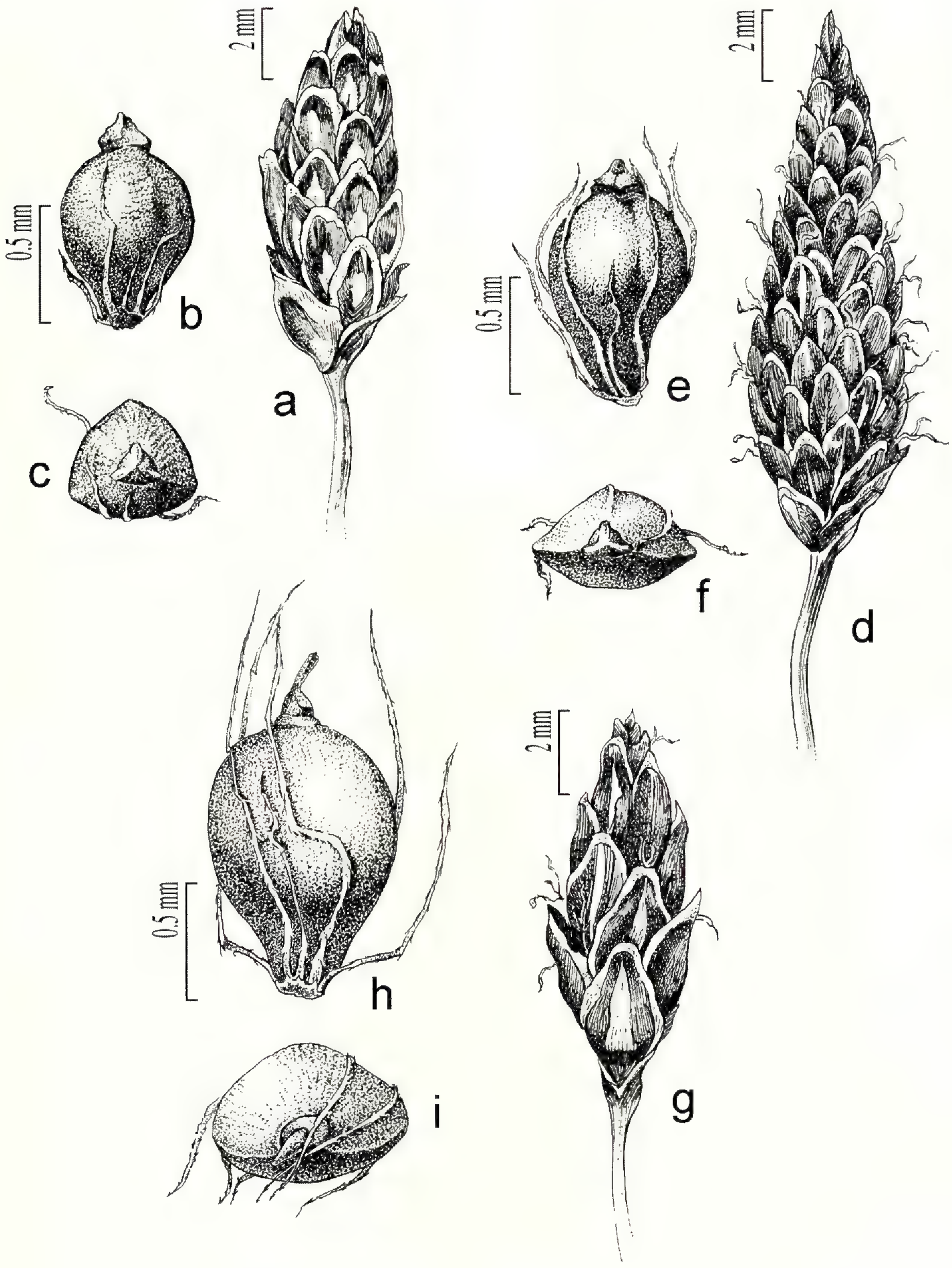


FIG. 2. Spikelets and achenes of *Eleocharis montevidensis*, *E. ignota*, and *E. dombeyana*. a–c, *E. montevidensis*: a. Spikelet. b. Achene, lateral view. c. Achene, seen from above. d–f, *E. ignota*: d. Spikelet. e. Achene, lateral view. f. Achene, seen from above. g–i, *E. dombeyana*: g. Spikelet. h. Achene, lateral view. i. Achene, seen from above. (Based on: a–c, *McVaugh 16915*, MICH; d–f, *González 5249*, MICH; g–i, *King 3004*, MICH.)

broadly acute. Achene 0.8–1.1 (–1.3) mm long including base and tubercle, the body 0.7–1 mm long, ca. 0.6–0.8 mm wide, broadly obovate in outline, obtusely triangular or plano-convex with the dorsal angle slightly costulate, pale yellow, finely reticulate and striate with many rows of linear, vertical cells, sometimes appearing nearly smooth, shiny; tubercle 0.15–0.23 mm long, 0.28–0.32 mm wide at the base, conic to deltoid, slightly spongy, whitish or greenish, sessile or with a short constriction at the summit of the achene. Perianth of 5–7 bristles appressed to achene, somewhat recurved

TABLE 1. Comparison of *Eleocharis montevidensis*, *E. dombeyana*, and *E. ignota*.

| | *E. montevidensis* | *E. dombeyana* | *E. ignota* |
|---|---|---|---|
| Rhizomes | slender, creeping | slender, creeping | thick, ligneous, not creeping |
| Persistent bases of older culms covering the rhizomes and base of clumps | absent or uncommonly present | absent or uncommonly present | often present |
| Cusp at apex of the upper sheath | mucronulate to mucronate, firm, never setiform at the apex | mucronate, firm, never setiform at the apex | subulate, fragile, often setiform at the apex |
| Size of cusp on apex of the upper sheath | 0.1–0.5 (–0.9) mm long, 0.2–0.3 mm wide at base | 0.4–1.2 mm long, 0.2–0.3 mm wide at base | (0.5–) 0.8–2 mm long, 0.1–0.2 mm wide at base |
| Spikelets (shape) | ovoid to ellipsoid; usually obtuse; | ovoid to lanceoloid, acute | narrowly ellipsoid to lanceoloid; acute or obtuse; |
| Spikelets (length) | 3–12 mm | 4–14 mm | 9–13 mm |
| Floral scales (apex) | broadly rounded | subacute to acute | rounded to subacute |
| Floral scales (color) | orange-brown to reddish or dark brown | dark purple to almost black | dark purple to almost black |
| Achene (body size) | 0.7–1 mm long, 0.6–0.8 mm wide | 0.8–1.2 mm long, (0.7–) 0.8 mm wide | 0.7–1 mm long, 0.6–0.8 mm wide |
| Achene (color) | golden-yellow to dark brown when fully mature | yellow to brown when fully mature | pale yellow |
| Achene (surface; 40×) | punctate-pitted or conspicuously reticulate | very finely reticulate to almost smooth | finely reticulate-striolated to almost smooth |
| Tubercle of achene | deltoid, 0.1–0.3 mm long | mucroniform to lanceoloid, 0.2–0.5 mm long | deltoid, 0.15–0.23 mm long |
| Perianth bristles | stramineous to pale reddish or brown | reddish to reddish brown | translucent, colorless to slightly reddish tinged |

and quite variable in length, shorter than or slightly longer than achene, colorless or slightly reddish tinged, translucent, retrorsely spinulose with translucent, colorless irregular prolongations, proximally slightly flattened, on a disc ca 0.1 mm long at the base of the achene. Style trifid. Stamens 3, filaments whitish to reddish, anthers pale yellow, thecae 1–1.5 mm long, the connective not prolonged.

Phenology. Flowering: May to August; fruiting: August (perhaps until November).

Distribution. Central Plateau of central-western Mexico (Durango, Jalisco, Guanajuato, and Michoacán); locally abundant in water-filled depressions in grasslands with shrubs (e.g., *Acacia schaffneri*) on very heavy clay soils, often halophytic; 1800–2200 m.

ADDITIONAL SPECIMENS EXAMINED. **Mexico**. DURANGO: Mpio. Súchil, Reserva de la Biosfera La Michilía, 3 km al S de El Alemán, cerca de la laguna Los Anegados, 23°18'35"N, 104°10'02"W, orilla de laguna, 2190 m, 6 Aug 1986, *F. Acevedo 172* (CIIDIR).—GUANAJUATO: 8 km al E de Yuriria, sobre la carretera

a Salvatierra, pastizal halófilo, 1800 m, 11 Aug 1986, *J. Rzedowski 40306* (CIIDIR, IEB) (distributed as *Eleocharis* aff. *montevidensis*).—JALISCO: near Km 57, just E of the Aguascalientes state line, road from Ojuelos, about 13 mi W of Paso de la Troje, permanently wet depressions in level grassland, 2000 m, 17 Aug 1958, *R. McVaugh 17041* (MICH); 40.4 km de la salida a San Juan de los Lagos por la carretera a Lagos de Moreno, suelos húmedos y encharcados a lo largo de la carretera, 1890 m, 28 Jul 1978, *R. Guzmán, Puga & Carvajal 1039* (IBUG); Campo Charro, carr. 80, entre Pegueros y Valle de Guadalupe, terreno semi-inundado, *A. Rodríguez 1287* (CIIDIR, IEB).—MICHOACÁN: NE de Maravatío, en terreno plano, dentro del agua, orilla de camino, potrero, 28 Jun 1986, *J. Santos Martínez 1435* (CIIDIR, IEB) (distributed as *Eleocharis* aff. *montevidensis*); Mpio. Morelia, 3 km adelante de San José Itzicuaro, rumbo a Quiroga, 2000 m, 9 Aug 1991, *M. Flores-Cruz 564, A. Espejo & A. R. López-Ferrari* (CIIDIR, UAMIZ).

*Eleocharis ignota* belongs to subgenus *Eleocharis* subseries *Truncatae*, a strictly American group (Svenson 1932) strongly in need of revision. *Eleocharis ignota* most closely resembles *E. montevidensis*; it can be separated from that species by a combination of characters: rhizomes ligneous, without long internodes, not long-creeping; apex of the upper sheaths truncate (versus truncate to slightly oblique), with a longer, subulate and fragile cusp; spikelets often acute and averaging longer; paler perianth bristles; and lighter, smoother achenes. The characters in which *E. ignota* differs from *E. montevidensis* and *E. dombeyana* Kunth, another widespread member of *Eleocharis* subseries *Truncatae* with which *E. ignota* can be confused, are given in Table 1 and illustrated in Fig 2. *Eleocharis dombeyana* was excluded from the *Flora Novo-Galiciana* (McVaugh 1993, p. 368), although Svenson had annotated a specimen as an anomalous form of this species; this collection (*McVaugh 17041*, MICH) represents *E. ignota*.

## ACKNOWLEDGMENTS

We are grateful to Rogers McVaugh for first pointing out this novelty. He should have been an author of this manuscript, but graciously deflected our attempts to convince him. An anonymous reviewer provided critical comments that helped to improve the manuscript. Figure 2 was prepared by Noel Bielaczyc. We thank Jorge A. Tena, I. Lorena López E., and Abel García A. for help in this study, and the curators of the following herbaria for making specimens available: CIIDIR, ENCB, IBUG, IEB, MEXU, and MICH. The first author also acknowledges CGPI, EDI, and COFAA of the Instituto Politécnico Nacional for support for research.

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# A NEW ENDEMIC SPECIES FOR PUERTO RICO: DENDROPHTHORA BERMEJAE (VISCACEAE)

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ABSTRACT. *Dendrophthora bermejae*, a species endemic to Puerto Rico, is newly described and illustrated. This novelty is similar to *D. serpyllifolia* (Griseb.) from Hispaniola and Cuba. A key to the four species now known from Puerto Rico is provided.

*Dendrophthora* is a neotropical genus of about 110 species (Kuijt 2000). Beyond the Greater Antilles, it ranges from southern Mexico to Bolivia and is mostly Andean in South America. In the Caribbean, about 32 species are recorded, with major concentrations in Cuba and Hispaniola. Three of the Caribbean species are known from Puerto Rico. The present contribution reports a fourth species from the Cabo Rojo region.

**Dendrophthora bermejae** Kuijt, Carlo & Aukema, sp. nov.—TYPE: PUERTO RICO. Cabo Rojo: roadside, Hwy PR-302, 17°58'07.8"N, 67°08'04.09"W, on *Guaiacum officinale* L., 30 m, 29 Aug 2004, *T. A. Carlo & J. E. Aukema 37* (holotype: UPR!; isotypes: LEA! MAPR! NY! UPRRP! US!). Fig. 1.

Planta glabra, plus minusve erecta, paucifolia, monoica. Inflorescentia plerumque 2–4-juga, internodiis fertilibus unisexualibus, quaque bractea fertili 3–10 flores subtenenti, floribus uniseriatis. Fructus 6 × 3.5 mm, petalis erectis.

Somewhat erect, glabrous, leafy plants, internodes to 4 cm, terete, grooved when dry; base of lateral branches and inflorescences subtended by brownish, carinate prophylls with slightly fimbriate margins, these prophylls occasionally subtending additional inflorescences or innovations; cataphylls absent or one small pair to 1.5 cm above the base, these often fertile. Basal foliar structures transverse. Leaves few, to 5 cm long, to 2 cm wide, obovate, apex rounded to truncate, base tapering to an indistinct petiole ca. 2 mm long; venation more or less palmate, with several veins running far towards the leaf tip. Monoecious. Inflorescences both single on older growth in axillary positions below leaves and in compound, squamate groups distal to them, where usually composed of two or three pairs of lateral inflorescences plus one terminal one. Individual inflorescences to 6.5 cm long, peduncle 1.5–3 cm long, without cataphylls, followed by 3–4 somewhat flattened, uniseriate, fertile internodes, the proximal one or two (three) female, the distal one or two male, the female internodes

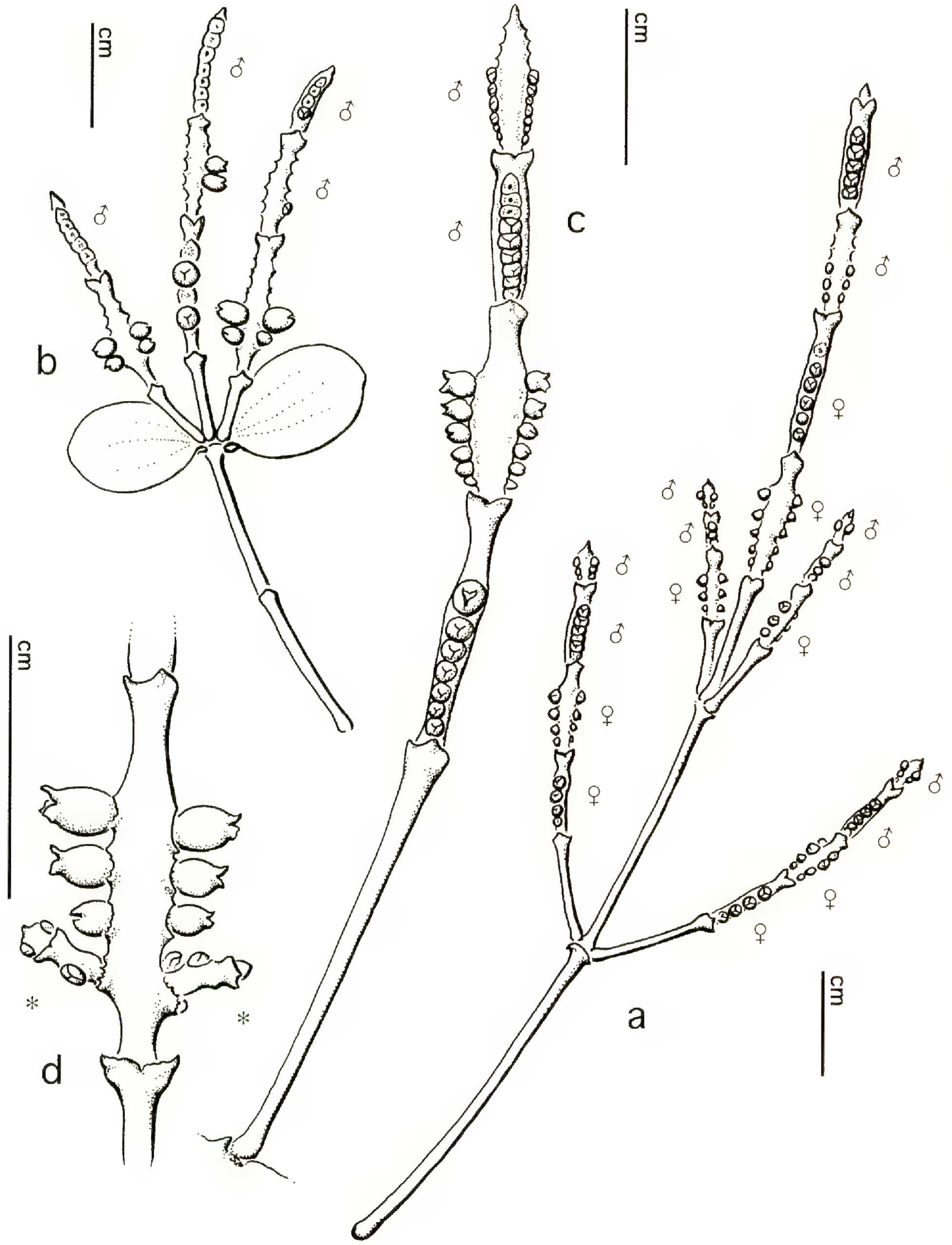


FIG. 1. *Dendrophthora bermejae* (the sex of female internodes is not indicated where fruits are evident). a. Large, squamate compound inflorescence without basal cataphylls. b. Smaller compound inflorescence, with basal cataphylls, the three individual inflorescences subtended by foliage leaves. c. Individual lateral inflorescence, placed below foliage leaves. d. Female fertile internode, the lower flowers replaced by small inflorescences (*). (Based on: a, *Carlo et al. 32*, LEA; b, *Carlo & Aukema 5*, LEA; c, d, *Carlo et al. 33*, LEA.)

with up to 8 flowers per series (16 per internode), the male internodes to 10 flowers per series (20 per internode), the latter crowded in a groove with low, delicate partitions between flowers. Fruit 6 mm long, 3.5 mm in diameter, ovoid, yellowish green, petals erect.

Additional Specimens Examined. **Puerto Rico.** Cabo Rojo: Las Palmas, road side, PR-303 at entrance to Pitahaya State Forest, on *Guaiacum officinalis*, *Carlo et al. 32* (LEA), *33* (LEA), *Carlo & Aukema 5* (LEA), *38* (UPR); Las Salinas, on *Guaiacum officinalis*, *Chardón et al. 500* (UPR); Quebrada Cajú, *Liogier 36831* (UPR); Barrio Boquerón, Peñones de Melones, upper slopes near summit, dry forest on limestone, 17°59.83'N, 67°10.97'W, 100 m, on *Guaiacum officinale*, *Axelrod & Thomas 7838* (UPRRP).—Without locality: *R.O. Woodbury s.n.* (# 015025) (UPR).

*Dendrophthora bermejae* represents a remarkable endemic apparently restricted to the southwestern Sierra Bermeja and Costa Bermeja area, where it is presently endangered by residential, commercial, tourist, and agricultural development. It is not known to occur within any protected area. The species appears to be related to *D. serpyllifolia* (Griseb.) Krug & Urb. from Hispaniola and Cuba but, aside from its much larger general stature, is distinct in a number of important respects. *Dendrophthora serpyllifolia* has leaves that rarely exceed 1 cm in length, with a mucronulate apex, and the placement of foliage leaves is irregular. *Dendrophthora bermejae*, instead, has leaves to 5 cm in length, more or less rounded at the tip. *Dendrophthora serpyllifolia* also has cataphylls in several positions, especially on all vegetative laterals and on the lowest inflorescence units of its compound ones (Kuijt 1961); *D. bermejae* has fewer cataphylls. The flowers of *D. serpyllifolia* occur in much smaller series (2–3 flowers per fertile bract) than in *D. bermejae* (to 10 flowers per fertile bract). The sex distribution in *D. serpyllifolia* is uncertain but the species is probably dioecious; in any case, it does not have the almost invariable, curious distribution of male and female flowers, or the slightly flattened fertile internodes exhibited by the present species.

*Dendrophthora bermejae* shows an unusual variability in several morphological aspects. Some inflorescences and lateral branches bear basal cataphylls, while others do not; we have not found any regularity in this feature except that the individual inflorescences making up a compound arrangement never seem to bear cataphylls. It is common for inflorescences to be associated with the axils of cataphylls, a phenomenon not known elsewhere in *Dendrophthora* although known from several species of the closely related *Phoradendron* (Kuijt 2003). The inflorescences of a compound cluster may be subtended by foliage leaves or not.

In one of the collections cited (*Carlo et al. 33*), the lowest two flowers of a number of female fertile internodes have been replaced by small lateral inflorescences (Fig. 1d). This is probably teratological in nature, and is also occasionally encountered in other species of *Dendrophthora* and *Phoradendron* (see Kuijt 1959, Fig. 11c).

The four species of *Dendrophthora* known from Puerto Rican may be distinguished with the following key.

## Key to the Species of Dendrophthora in Puerto Rico

1. Fruits 1 or 2 per fertile bract; plants monoecious or dioecious.
   2. Young branches with minute, glistening epidermal hairs; female flowers (1) 2 per fertile bract; prophylls inconspicuous, not obviously fused. *D. brachylepis* Urb.
   2. Young branches glabrous; female flowers 1 per fertile bract; prophylls conspicuous, fused into a compound structure. *D. domingensis* (Spreng.) Eichler
1. Fruits 3–8 per fertile bract; plants monoecious.
   3. Male and female flowers intermixed; inflorescence branches often sinuous, fertile internodes 1–12 (–20) per inflorescence, flowers 5 or 6 per fertile bract; fruits eventually widely spaced along the fertile internode. *D. flagelliformis* (Lam.) Krug & Urb.
   3. Male and female flowers on separate internodes, the male flowers on terminal internode, the female flowers on lower ones; inflorescence branches more or less straight; fertile internodes 3 or 4 per inflorescence, each bearing 3–10 flowers; fruits crowded on fertile internode. *D. bermejae*

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# TYPE SPECIMENS OF VASCULAR PLANTS IN THE HERBARIUM OF THE INSTITUTO POLITECNICO NACIONAL IN DURANGO, MEXICO (CIIDIR)

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ABSTRACT. The type specimens in the Herbarium CIIDIR of the National Polytechnic Institute in Durango, Mexico, are listed. CIIDIR is a regional collection holding more than 42,000 specimens of vascular plants mainly from the Sierra Madre Occidental and the Chihuahuan desert of northern Mexico. Currently 87 types are catalogued, including 9 holotypes, 77 isotypes, and 1 isoneotype.

RESUMEN. Se registran los especímenes tipo depositados en el herbario CIIDIR del Instituto Politécnico Nacional en Durango, México. CIIDIR es una colección regional que cuenta con más de 42,000 especímenes de plantas vasculares incluídos, principalmente de la Sierra Madre Occidental y del Desierto Chihuahuense. Se tienen catalogados 87 tipos: 9 holotipos, 77 isotipos y 1 isoneotipo.

Herbaria are essential for documenting plant diversity and for accurate planning of actions for the sustainable management of natural resources and ecosystems. CIIDIR is a research center for floristic and ecological studies that is part of the National Polytechnic Institute based in Durango, Mexico. The Herbarium CIIDIR was founded in 1981 with a focus on vascular plants. It is the first institutional herbarium in Durango and now houses one of the largest scientific collections in northwestern Mexico. In the last 22 years the collection was moved six times within the state of Durango and still does not have a permanent facility. The collection currently comprises more than 42,000 sheets with ca. 8,000 additional specimens awaiting accession. The main families represented in the herbarium are Asteraceae, Poaceae, Leguminosae, and Cyperaceae (López et al. 2001). The importance of these families in the herbarium is indicative of the floristic composition of the state of Durango and reflects the research interests of the curators. Most of the collections are from the northern and central Mexico, particularly from the Sierra Madre Occidental and the Chihuahuan Desert. The remainder includes largely material from other parts of Mexico, as well as a lesser representation from the U.S.A. and South America. A database of the vascular plants of the Mexican state of Durango currently contains more than 28,000 records.

Several publications summarize the contents and importance of collections in Mexican herbaria and their potential use in understanding the biodiversity of the country. For example, Rzedowski (1976), and Arreguín and Valenzuela (1986) have published catalogues of the herbaria in Mexico, and Dávila and Germán (1991) described in more detail the collections in the National Herbarium of Mexico. Shetler (1973) addressed the importance of recording information about type specimens. More recently, CONABIO (The Mexican Agency of the Understanding and Use of Biodiversity) has made available electronic catalogues that include lists of Mexican

herbaria [http://www.conabio.gob.mx/informacion/acttax/doctos/cc.html; http://www.conabio.gob.mx/informacion/acttax/doctos/dircolecciones.html], taxonomic experts [http://www.conabio.gob.mx/informacion/acttax/doctos/directax.html], and taxonomic authorities [http://www.conabio.gob.mx/informacion/acttax/doctos/dircolecciones.html].

Information about type specimens deposited in Mexican herbaria is still scarce (Arreguín et al. 1996). In the Appendix we present data from the type specimens housed in the Herbarium CIIDIR as of August, 2003. The collection data are presented as complete as possible, and the names of authors follow Villaseñor (2001), based on Brummitt and Powell (1992). The Herbarium CIIDIR has cataloged 87 types, including 9 holotypes, 77 isotypes, and 1 isoneotype. More than one third of the taxa represented belong to the Asteraceae (32), and 13 belong to Cyperaceae. In addition, the Herbarium CIIDIR houses at least 78 paratypes, as well as many photographs of types and many specimens collected in type localities (topotypes).

## ACKNOWLEDGMENTS

We thank professors J. Rzedowski and G. Rzedowski (IEB), and the staff at the herbaria of athe University of Texas at Austin and of the University of Michigan for literature donated to CIIDIR. Professor Rzedowski has enriched the collections at CIIDIR with a large number of type specimens sent in exchange. We also acknowledge Jorge A. Tena and Sandra Tena-González for their comments on a draft of the manuscript, and Jose Panero for his review. We are grateful to CGPI, EDI, and COFAA of the Instituto Politécnico Nacional for their support of our research.

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# APPENDIX

## Type Specimens in the Herbarium of the Instituto Politecnico Nacional in Durango, Mexico (CIIDIR)

### ASTERACEAE

*Acourtia acevedoi* M. González-Elizondo, Phytologia 61: 117. 1986. [=*Acourtia macrocephala* Sch. Bip. ex Seem.]—**Mexico.** Durango: Mpio. Vicente Guerrero, Rincón de las Mulas, 3 Km al SW de San Isidro, 2180 m, 16 Feb 1985, *S. Acevedo 163*.—Holotype; Isotype.

*Acourtia wislizenii* (A. Gray) Reveal & R. M. King var. *subscaposa* B. L. Turner, Phytologia 74: 409. 1993.—**Mexico.** Durango: Mpio. El Mezquital, 1.5 km de Los Charcos, 2650 m, 21 Sep 1982, *R. Fernández N. 1161*.—Isotype.

*Ageratina acevedoana* B. L. Turner, Phytologia 75: 402. 1993.—**Mexico.** Durango: Mpio. Canelas, 10 km de Canelas, por el camino a Santiago Papasquiaro, 1060 m, 10 Mar 1987, *S. Acevedo & D. Bayona 190*.—Isotype.

*Ageratina gonzalezorum* B. L. Turner, Phytologia 58: 498. 1985.—**Mexico.** Durango: Mpio. El Mezquital, 19 km de Los Charcos, por el camino a Sta. Ma. Ocotán, 2400 m, 5 Oct 1983, *S. González & M. González 2558*.—Isotype.

*Aster moranensis* var. *turneri* S. D. Sundb. & Jones, Bull. Torr. Bot. Club 113: 173. 1986.—**Mexico.** Durango: Mpio. El Mezquital, W de Santa Ma. de Ocotán, a lo largo de margenes de arroyo, 16 Oct 1984, *M. González 1518 & S. Acevedo*.—Isotype.

*Axiniphyllum durangense* B. L. Turner, Madroño 34: 165. 1987.—**Mexico.** Durango: Mpio. El Mezquital, alrededores de Plátano Tatemado (a 12 km de La Guajolota), en margenes de arroyo, en ciénaga, 12 Sep 1985, *I. Solís 294*.—Isotype.

*Erigeron basaseachensis* G. L. Nesom, Phytologia 66: 426. 1989.—**Mexico.** Chihuahua: Mpio. Ocampo, area of La Cascada of Basaseachic at the confluence of Río Candamena and Río Durazno, ca. 2 mi S of village of Basaseachic, 28°02'N, 107°55'W, 2000–2100 m, 18 Aug 1984, *G. L. Nesom 5089 with P. Lewis*.—Isotype.

*Erigeron caulinifolius* G. L. Nesom, Phytologia 66: 428. 1989.—**Mexico.** Chihuahua: Mpio. Guadalupe y Calvo, NW side of Cerro Mohinora, ca. 12.5 mi SW of Guadalupe y Calvo, past turnoff to peak, downslope on road toward Sinaloa, 26°00'N, 107°03'W, 2470 m, 21 Aug 1988, *G. L. Nesom 6483a with A. McDonald*.—Isotype.

*Erigeron coroniglandifer* G. L. Nesom, Phytologia 66: 432. 1989.—**Mexico.** Chihuahua: Mpio. Guadalupe y Calvo, 78.9 km SW of El Vergel on road to Guadalupe y Calvo, ca. 212 km SSW of Hidalgo del Parral ca. 1.3 km S of bridge in Turuachi, W-facing side of deep, N-S trending canyon, 26°09'N, 106°44'W, 2050 m, 28 Aug 1983, *G. L. Nesom 4964*.—Isotype.

*Erigeron sceptrifer* G. L. Nesom, Phytologia 69: 248. 1990.—**Mexico.** Chihuahua: Mpio. Cuauhtémoc, 17.6 km W of Cuauhtémoc on Hwy 16, 7200 ft, 23 Aug 1981, *G. L. Nesom 4477*.—Isotype.

*Erigeron zacatensis* G. L. Nesom, Phytologia 69: 247. 1990.—**Mexico.** Zacatecas: ca. 2 mi W of Sombrerete on Hwy 45, at crest of hill overlooking town, 8200 ft, 18 Aug 1981, *G. L. Nesom 4423*.—Isotype.

*Gaillardia powellii* B. L. Turner, Southw. Naturalist 17: 183. 1972.—**Mexico.** Coahuila: Estación Hermanas, 0.5 mi S, growing in pure gypseous soil, 11 Apr 1970, *B. L. Turner 6023*.—Isotype.

*Haplopappus thiniicola* Rzed. & E. Ezcurra, Ci. Interamer. 26: 16. 1986. [=*Heterotheca thiniicola* (Rzed. & E. Ezcurra) B. L. Turner]—**Mexico.** Sonora: Mpio. Puerto Peñasco, Gran Desierto de Altar, 8 km NE de la estación Gustavo Sotelo, dunas de arena parabólicas, semi-móviles, 17 Dec 1984, *E. Ezcurra 84001*.—Isotype.

*Isocoma tomentosa* G. L. Nesom, Phytologia 70: 109. 1991.—**Mexico.** Chihuahua: Baños de San Diego, 1.8 Km E of San Diego de Alcala, ca. 16 Km NE of jct. of local road with Hwy 45 (the jct. 19.5 km SE of Cd. Chihuahua), gypseous area of hot springs and small streams flowing into salt flats, small hills of exposed gypsum, 28°36'N, 105°31'W, ca. 1200 m, 14 Oct 1986. *G. L. Nesom 5478 with L. Vorobik*.—Isotype.

*Jaegueria glabra* B. L. Rob. var. *nana* B. L. Turner, Phytologia 55: 248. 1984.—**Mexico.** Chihuahua: 5 km NE of El Vergel on Hwy 24 toward Parral, aquatic, abundant in water of roadside ditches and permanent pools beside road and edge of woods, area of pine-oak-madroño, 9000 ft, 21 Aug 1981, *G. L. Nesom 4472*.—Isotype.

*Laennnecia spellenbergii* G. L. Nesom, Phytologia 73: 267. 1992.—**Mexico.** DURANGO: Mpio. Súchil, ca. 47 air km SSW of Vicente Guerrero on road to Las Margaritas, on the Reserva de la Biosfera "La Michilía," on general south slope of Cerro Blanco, 2590 m, 23 Jul 1990, *R. Spellenberg 10285, S. González E.*—ISOTYPE.

*Sabazia gonzalezae* B. L. Turner, Phytologia 63: 307. 1987. [=*Alloispermum gonzalezae* (B. L. Turner) B. L. Turner]—**Mexico.** DURANGO: Mpio. El Mezquital, 20 km de La Guajolota, por el camino a San Fco. Ocotán, 2440 m, 14 Nov 1985, *M. González & al. 1882.*—ISOTYPE.

*Senecio gesnerifolius* B. L. Turner, Phytologia 62: 75. 1987.—**Mexico.** DURANGO: Mpio. El Mezquital, 26.5 km de La Guajolota por el camino a Platanitos, 2610 m, 15 Mar 1985, *M. González & al. 1677.*—ISOTYPE.

*Senecio gonzalezae* B. L. Turner, Phytologia 57: 377. 1985.—**Mexico.** DURANGO: Mpio. El Mezquital, 3 km al S de Sta. María de Ocotán, 17 Oct 1984, *M. González & S. Acevedo 1558.*—ISOTYPE.

*Tridax durangensis* García Arév., Acta Bot. Mex. 12: 9. 1990.—**Mexico.** DURANGO: Mpio. El Mezquital, aprox. 4 km de Candelarita Chico, 21 Aug 1988, *I. Solís 958.*—HOLOTYPE.

*Verbesina durangensis* B. L. Turner, Phytologia 60(4): 254. 1986.—**Mexico.** DURANGO: Mpio. El Mezquital, alrededores de La Guajolota, 16 Aug 1985, *I. Solís 229.*—ISOTYPE.

*Verbesina hygrophila* Panero & Villaseñor, Contr. Univ. Michigan Herb. 19: 181. 1993.—**Mexico.** DURANGO: 14 km E of Canelas on road to Santiago Papasquiaro. 2180 m, 28 Aug 1991, *J. L. Panero 2253, S. González & S. Acevedo.*—ISOTYPE.

*Verbesina nayaritensis* B. L. Turner, Phytologia 63: 10. 1987.—**Mexico.** NAYARIT: Mpio. Huajicori, 2 km del Rancho de Los Sauces, 8 Nov 1985, *I. Solís 560.*—ISOTYPE.

*Verbesina papasquiara* Panero & Villaseñor, Contr. Univ. Michigan Herb. 19: 186. 1993.—**Mexico.** DURANGO: 93 km NW of Canatlán on road to Santiago Papasquiaro. 2170 m, 31 Aug 1991, *J. L. Panero 2264, S. González, and S, Acevedo.*—ISOTYPE.

*Viguiera huajicoria* B. L. Turner, Phytologia 72: 55. 1992.—**Mexico.** NAYARIT: Mpio. Huajicori, 2 km del Rancho de los Sauces, 3 Nov 1985, *I. Solís 556.*

*Viguiera inegii* S. González, M. González-Elizondo & Rzed., Acta Bot. Mex. 53: 39. 2000.—**Mexico.** DURANGO: Mpio. Rodeo, Las Animas, ± 1 km al NE, sobre la carretera a Nazas, 25°08'36"N, 104°25'59"W, 1340 m, 5 Aug 1997, *S. González 5907, M. González & S. Acevedo.*—ISOTYPE.

*Viguiera oligantha* S. González, M. González-Elizondo & Rzed., Acta Bot. Mex. 53: 37. 2000.—**Mexico.** DURANGO: Mpio. Rodeo, Las Animas ±1 km al NE, sobre la carretera a Nazas, 25°8'36"N, 104°25'59"W, 1340 m, 5 Aug 1997, *S. González 5909, M. González & S. Acevedo.*—ISOTYPE.

*Wedelia gonzaleziarum* B. L. Turner (as *gonzalezorum*). Phytologia 65: 349. 1988.—**Mexico.** DURANGO: Mpio. El Mezquital, al W de Sta. María Ocotán, 16 Oct 1984, *M. González 1525 with S. Acevedo.*—ISOTYPE.

## BURSERACEAE

*Bursera laurihuertae* Rzed. & Calderón, Acta Bot. Mex. 52: 75. 2000.—**Mexico.** OAXACA: Mpio. Totolapan, 3 km al NE de San Juan Guegoyache, 950 m, 9 Aug 1976, *J. Rzedowski 34383.*—ISOTYPE.

*Bursera medranoana* Rzed. & E. Ortíz, Acta Bot. Mex. 1: 17. 1988.—**Mexico.** HIDALGO: Mpio. Cardonal, fondo de la Barranca de Tolantongo, 1300 m, 30 May 1984, *J. Rzedowski 38401a.*—ISOTYPE.

*Bursera palaciosii* Rzed. & Calderón, Acta Bot. Mex. 50: 47. 2000.—**Mexico.** JALISCO: Mpio. La Huerta, Estación de Biología Chamela, cerca de Chamela, 100 m, 26 Jul 1982, *J. Rzedowski 37882.*—ISOTYPE.

*Bursera ribana* Rzed. & Calderón, Acta Bot. Mex. 50: 51. 2000.—**Mexico.** JALISCO: Mpio. Tomatlán, 6 km al S de Tomatlán, sobre la carretera a La Cumbre, 50 m, 27 Jul 1982, *J. Rzedowski 37886.*—ISOTYPE.

*Bursera vazquezyanesii* Rzed. & Calderón, Acta Bot. Mex. 50: 55. 2000.—**Mexico.** JALISCO: Mpio. Cabo Corrientes, 14 km al W de El Tuito, sobre el camino a Llano Grande de Ipala, 500 m, 27 Jul 1982, *J. Rzedowski 37888.*—ISOTYPE.

## CAMPANULACEAE

*Lobelia flexicaulis* Rzed. & Calderón, Acta Bot. Mex. 55: 35. 2001.—**Mexico.** GUERRERO: Mpio. Taxco, 7 km al SSE de Tetipac, sobre el camino a Taxco, 2100 m, 18 Nov 2000, *J. Rzedowski 53779.*—2 ISOTYPES.

*Lobelia orientalis* Rzed. & Calderón, Acta Bot. Mex. 40: 62. 1997.—**Mexico.** QUERÉTARO: Mpio. Landa, Llano Chiquito, 21°23'N, 99°06'W, 2000 m, 1–2 Apr 1997, *S. Zamudio & E. Carranza 10200.*—ISOTYPE.

## COMMELINACEAE

*Commelina nivea* López-Ferrari, Espejo & Ceja, Acta Bot. Mex. 41: 10. 1997.—**Mexico.** DURANGO: Mpio. Pueblo Nuevo, 20 km después de El Salto, rumbo a Mazatlán, 23°44'32"N 105°30'13"W, 2730 m, 7 Aug 1996, *A. Espejo 5458, A. R. López-Ferrari, J. Ceja & A. Mendoza R.*—ISOTYPE.

*Commelina socorrogonzaleziae* Espejo & López-Ferrari, Sida 15: 441. 1993.—**Mexico.** DURANGO: Mpio. El Salto [Pueblo Nuevo], 2 km después de Coyotes, sobre la desviación a San Miguel de Cruces, llanos inundables, 2420 m, 28 Jul 1991, *M. Flores Cruz (502), A. Espejo & A. R. López Ferrari.*—ISOTYPE.

## CONVALLARIACEAE

*Maianthemum mexicanum* García Arév., Acta Bot. Mex. 17: 19. 1992.—**Mexico.** DURANGO: Mpio. Durango, Predio Las Bayas de la UJED, Arroyo La Tecolota, 2800 m, 16 Jul 1991, *A. García 1008 with S. Acevedo.*—HOLOTYPE; ISOTYPE.

## CONVOLVULACEAE

*Ipomoea rzedowskii* E. Carranza, Zamudio & G. Murguía, Acta Bot. Mex. 45: 32. 1998.—**Mexico.** HIDALGO: Yethay, Mpio. Zimapán, 1700 m, 19 Aug 1996, *S. Zamudio 9970 & E. Pérez C.*—ISOTYPE.

## CRASSULACEAE

*Sedum clausenii* E. Pérez-Calix, Acta Bot. Mex. 43: 1. 1998.—**Mexico.** GUANAJUATO: Mpio. Victoria, 3.5 km al N de Joya Fría, camino a Puerto de Palmas, 2380 m, 25 Abr. 1997, *E. Pérez C. 3615 & E. Carranza.*—ISOTYPE.

## CYPERACEAE

*Carex boliviensis* subsp. *occidentalis* Reznicek & S. González, Contr. Univ. Michigan Herb. 23: 342. 2001.—**Mexico.** DURANGO: Mpio. Durango, aprox. 61 km al S de Durango, por el camino a La Flor, 2670 m, 13 Jul 1990, *S. González 4461 with A. García & S. Acevedo.*—HOLOTYPE.

*Carex complanata* subsp. *tropicalis* Reznicek & S. González, Contr. Univ. Michigan Herb. 23: 344. 2001.—**Mexico.** CHIAPAS: Mpio. Larrainzar, along road between San Andrés Larrainzar and Puerto Cato, 16°55'04"N, 92°45'34"W, 12 Jul 1997, *S. González, A. A. Reznicek 10515, M. González & M. Pinedo.*—ISOTYPE.

*Carex congestiflora* Reznicek & S. González, Contr. Univ. Michigan Herb. 22: 121. 1999.—**Mexico.** CHIAPAS: Mpio. Tenejapa, ca. 1 km S of Tenejapa, (Km 26.7) along road to San Cristóbal de las Casas, 16°49'03"N, 92°30'08"W, 2100 m, 10 Jul 1997, *S. González, A. A. Reznicek 10472, M. González & M. Pinedo.*—ISOTYPE.

*Carex longiligula* Reznicek & S. González, Contr. Univ. Michigan Herb. 23: 333. 2001.—**Mexico.** CHIAPAS: Mpio. Tenejapa, along the road to Matzam, 2.3 km from the jct. with the San Cristóbal de las Casas–Tenejapa road, in marsh along a small, clear stream, 16°46'51"N, 92°32'01"W, 2400 m, 11 Jul 1997. *S. González, A. A. Reznicek 10506, M. González & M. Pinedo.*—ISOTYPE.

*Carex pinophila* Reznicek & S. González, Contr. Univ. Michigan Herb. 21: 294. 1997.—**Mexico.** QUERÉTARO: Mpio. Landa de Matamoros, ca. 2 km SW of Pinal de Amoles on road (Hwy 120) to San Juan del Río, 21°07'47"N, 99°38'02"W, 2700 m, 15 Jul 1996, *S. González, A. A. Reznicek 10293, M. Pinedo.*—ISOTYPE.

*Carex queretarensis* Reznicek & S. González, Contr. Univ. Michigan Herb. 21: 291. 1997.—**Mexico.** QUERÉTARO: Mpio. Landa de Matamoros, Ca. 7.5 (air) km SW of El Lobo (Km 226) on road (Hyw 120) to Jalpan, between El Lobo and Landa, 21°15'50" N, 99°10'13"W, 1590–1600 m, 14 Jul 1996. *S. González, A. A. Reznicek 10284, M. Pinedo.*—ISOTYPE.

*Carex rzedowskii* Reznicek & S. González, Contr. Univ. Michigan Herb. 20: 218. 1995.—**Mexico.** MICHOACÁN: Mpio. Morelia, alrededores de Loma Caliente, próxima a Umécuaro, lugares pantanosos, 2200 m, 27 Nov 1991, *J. Rzedowski 51352.*—ISOTYPE.

*Carex tenejapensis* Reznicek & S. González, Contr. Univ. Michigan Herb. 22: 121. 1999.—**Mexico.** CHIAPAS: Mpio. Tenejapa, ca. 1 km S of Tenejapa (Km 26.7) along road to San Cristóbal de las Casas, 16°49'03"N, 92°30'08"W, 2100 m, 10 Jul 1997, *S. González, A. A. Reznicek 10467, M. González & M. Pinedo.*—ISOTYPE.

*Eleocharis canindeyuensis* F. Mereles & S. González, Candollea 58: 75. 2003.—**Paraguay.** CANENDEYÚ: 15 km SE of Katueté, isolated pond in middle of cultivated field, 24°15'S, 65°40'W, 15 Feb 1984, *W. Hahn 2069.*—ISOTYPE.

*Eleocharis debilis* f. *anomala* S. González & Reznicek, Novon 6(4): 358. 1996.—**Venezuela.** AMAZONAS: Atabapo, Salto Yureba, Cerro Yureba, lower Ventuari, riverbank, 04°03'N, 66°01'W, 350 m, 14 Mar 1985, *R. L. Liesner 18670.*—ISOTYPE.

*Eleocharis montevidensis* f. *angustior* S. González & McVaugh, Flora Novo-Galiciana 13: 362. 1993.—**Mexico.** JALISCO: 22 km de Lagos de Moreno, por la carretera a Guadalajara, en charcos, 12 Aug 1992, *S. González 5249, A. García & L. López.*—HOLOTYPE.

*Eleocharis rzedowskii* S. González, Phytologia 57: 381. 1985.—**Mexico.** NUEVO LEÓN: Mpio. Galeana, Laguna de Labradores, a orilla de laguna, 29 Aug 1984, *S. González & J. Tena 2946.*—HOLOTYPE.

*Eleocharis svensoniana* S. González, Phytologia 57: 383. 1985.—**Mexico.** DURANGO: Mpio. El Mezquital, 31 km de La Guajolota, orilla de estanque, 2000 m, 8 Oct 1983, *S. González 2696, M. González & S. Acevedo.*—HOLOTYPE.

## EBENACEAE

*Diospyros xolocotzii* Madrigal & Rzed., Acta Bot. Mex. 1: 3. 1988.—**Mexico.** MICHOACÁN: Mpio. Morelia, Mintzita, 1930 m, 15 Apr 1987, *X. Madrigal Sánchez 4245.*—ISOTYPE.

## ERICACEAE

*Arbutus madrensis* S. González, Acta Bot. Mex. 17: 8. 1992.—**Mexico.** DURANGO: Pico La Grulla, predio Las Baya (UJED), 95 km al S de la Cd. de Durango, 2650 m, 15 Jul 1991, *S. González 4577, A. García & S. Acevedo.*—ISOTYPE.

## EUPHORBIACEAE

*Sebastiania cornuta* McVaugh, Contr. Univ. Michigan Herb. 20: 205. 1995.—**Mexico.** DURANGO: Mpio. Otáez, Otáez, frente al rancho La Lechuguilla, 1270–1700 m, 25 Jul 1990, *E. Guízar N. 2347.*—ISOTYPE.

## FABACEAE

*Astragalus rupertii* Villarreal & E. Carranza, Brittonia 46: 335. 1994.—**Mexico.** COAHUILA: Estación de Microondas Vega, 8 km W de Saltillo, Carr. 40, 25°26'N, 101°06'W, 1800 m, 2 Jun 1992, *J. A. Villarreal 6644, M. A. Carranza, D.E. Lozano & S. Comparán.*—ISOTYPE.

*Mimosa setuliseta* Villarreal, Acta Bot. Mex. 20: 45. 1992.—**Mexico.** DURANGO: Mpio. Lerdo, Sierra del Rosario, camino a la estación de microondas Sapioris, carr. 49, 30 km al SE de Lerdo, 1750–1800 m, 9 Nov 1990, *J. A. Villarreal 5790 & M. A. Carranza.*—ISOTYPE.

## FAGACEAE

*Quercus mcvaughii* Spellenb., Amer. J. Bot. 79: 1200. 1992.—**Mexico.** CHIHUAHUA: Mpio. Ocampo, Parque Nacional de la Cascada de Basaseachic, 108°12'W, 28°13'N, ca. 1800 m, 22 Jun 1989, *R. Spellenberg 9821, W. Boecklen, J. Zimmerman.*—ISOTYPE.

## GENTIANACEAE

*Gentianella canosoi* G. L. Nesom & B. L. Turner, Sida 14: 227. 1990.—**Mexico.** DURANGO: Mpio. Pueblo Nuevo, alrededores de El Salto, 2700 m, 4 Oct 1981, *S. González & S. Acevedo 2053.*—ISOTYPE.

*Gentiana durangensis* Villarreal, Acta Bot. Mex. 34: 49. 1996.—**Mexico.** DURANGO: Mpio. Canelas, Canelas, 28.5 km por el camino a Durango. 2650 m, 6 Oct 1985, *S. González 3464.*—ISOTYPE.

*Gentianella heterosepala* subsp. *durangensis* Villarreal, Sida 17: 111. 1996.—**Mexico.** DURANGO: Mpio. Canelas, Canelas, 28.5 km por el camino a Durango, 2650 m, 6 Oct 1985, *S. González 3446, M. González & Y. Herrera*.—ISOTYPE.

## IRIDACEAE

*Nemastylis latifolia* Weath., Proc. Amer. Acad. Arts 45: 423. 1910. [=*Sessilanthera latifolia* (Weath.) Molseed & Cruden]—**Mexico.** GUERRERO: hills near Iguala, 3000 ft, 29 July 1907, *C. G. Pringle 10391*.—ISOTYPE.

*Sisyrinchium arguellesiae* Ceja, Espejo & López-Ferrari, Acta Bot. Mex. 44: 88. 1998.—**Mexico.** QUERÉTARO: 1 km al SW de Pinal de Amoles, sobre la carretera a Vizarrón, 2500 m, 15 Mar 1987, *J. Rzedowski 42685*.—ISOTYPE.

*Sisyrinchium zamudioi* Espejo, López-Ferrari & Ceja, Acta Bot. Mex. 45: 44. 1998.—**Mexico.** SAN LUIS POTOSÍ: Mpio.Villa Juárez, cerros entre Guaxacamá y Buenavista, suelo yesoso y pedregoso, 22°12'27"N, 100°17'03"W, 1290 m, 15 Nov 1997, *J. Ceja 622, A. Espejo, A. R. López Ferrari & A. Mendoza R.*—ISOTYPE.

*Tigridia estelae* López-Ferrari & Espejo, Novon 4: 386. 1994.—**Mexico.** DURANGO: Mpio. Pueblo Nuevo, El Madroño, carretera El Salto–Mazatlán, 2350 m, 29 Jul 199, *A.R. López Ferrari 1520, A. Espejo & M. Flores*.—2 ISOTYPES.

## LAMIACEAE

*Cunila crenata* García-Peña & Tenorio, Anales Inst. Biol. Univ. Nac. Autón. México, Ser. Bot. 68(1): 1. 1997.—**Mexico.** DURANGO: Mpio. Topia, Topia, 1450–1800 m, 19 Sep 1985, *P. Tenorio L. 9809, C. Romero de T., J. Ignacio S. & P. Dávila*.—ISOTYPE.

*Hedeoma quinquenervata* Bartlett, Proc. Amer. Acad. Arts 44: 634. 1909. [=*Hedeoma costatum* Gray var. *costatum*]—**Mexico.** NUEVO LEÓN: Sierra Madre above Monterrey, 3000 ft, 9 Apr 1906, *C. G. Pringle 10241*.—ISOTYPE.

*Stachys herrerana* Rzed. & Calderón, Acta Bot. Mex. 3: 2. 1988.—**Mexico.** HIDALGO: Mpio. Epazoyucan, 1 km al S de El Guajolote, 2800 m, 25 Aug 1984, *J. Rzedowski 38464*.—ISOTYPE.

*Stachys vulnerabilis* Rzed., Acta Bot. Mex. 3: 3. 1988.—**Mexico.** NUEVO LEÓN: Mpio. Galeana, Cima del Cerro Potosí, 3460 m, 7 Jul 1987, *S. González 4029*.—ISOTYPE.

## LENTIBULARIACEAE

*Pinguicula gracilis* Zamudio, Acta Bot. Mex. 3: 25. 1988.—**Mexico.** NUEVO LEÓN: Mpio. Monterrey, ladera N del Cerro de las Mitras, 1450 m, 19 Feb 1987, *S. Zamudio & S. González 5184*.—ISOTYPE.

*Pinguicula moranensis* var. *neovolcanica* Zamudio, Acta Bot. Mex. 49: 27. 1999.—**Mexico.** HIDALGO: Mpio. Real del Monte, Barrio Escobar, cerca de la antigua mina de Morán, 2500 m, 17 Aug 1993, *S. Zamudio R. 9144*.—ISOTYPE.

*Pinguicula takakii* Zamudio & Rzed., Phytologia 60: 260. 1986.—**Mexico.** SAN LUIS POTOSÍ: Mpio. Villa Juárez, minas de Guascamá, 2 km al SE de Buenavista. 1400 m, ladera yesosa. 18 Dec 1980, *S. Zamudio R. 3789*.—ISOTYPE.

## ONAGRACEAE

*Megacorax gracielanus* S. González & W. L. Wagner, Novon 12: 361. 2002.—**Mexico.** DURANGO: Nuevo Ideal, Sierra de Coneto, al N de Dr. Castillo del Valle, por el camino a Ignacio Zaragoza, 25°05'11"N, 104°57'10"W, 2210 m, 5 Nov 2001, *S. Acevedo, L. López & S. González 1352*.—ISOTYPE.

## ORCHIDACEAE

*Bletia greenwoodiana* Sosa, Brittonia 46: 208. f 1. 1994.—**Mexico.** DURANGO: Mpio. El Mezquital, 22 km al S de Charcos, camino a Sta. María Ocotán. 2250 m, 6 Oct 1983, *R. Fernández N. 1847*.—ISOTYPE.

*Liparis volcanica* R. González-Tamayo & Zamudio, Acta Bot. Mex. 23: 60–64. 1993.—**Mexico.** MICHOACÁN: Mpio. Uruapan, 2 km al N de Caltzontzin, 1700 m, 2 Sep 1991, *E. Pérez 2594 & S. Zamudio*.—ISOTYPE.

## POACEAE

*Muhlenbergia aguascalientensis* Y. Herrera & De la Cerda, Novon 5: 278. 1995.—**Mexico.** AGUASCALIENTES: Mpio. San José de Gracia, NW of Aguascalientes, 12 km NW from La Congoja, Playa Mariquitas, Monte Grande de la Sierra Fría, 22°15'6.7"N, 102°37'24.9"W, 2850 m, 8 Nov 1986, *G. García 2801*.—ISOTYPE.

*Muhlenbergia durangensis* Y. Herrera, Phytologia 63: 457. 1987.—**Mexico.** DURANGO: Mpio. El Mezquital, 32 km de Los Charcos, por el camino a La Guajolota, 2040 m, 15 Mar 1985, *M. González et al. 1659*.—HOLOTYPE.

*Muhlenbegia michisensis* Y. Herrera & Peterson, Novon 2: 117. 1992.—**Mexico.** DURANGO: Mpio. Súchil, Rancho Las Escobas, San Juan de Michis, 20 Sep 1989, *Y. Herrera 986 & S. Acevedo*.—HOLOTYPE.

## RUBIACEAE

*Elaeagia uxpanapensis* Lorence, Bol. Soc. Bot. Mex. 45: 65. 1983.—**Mexico.** OAXACA: Mpio. Matías Romero, 2 km al SW del Aserradero La Floresta, sobre camino al Río Verde, 15 km al S de Esmeralda, 17°03'N, 94°47'W, 250 m, 25 May 1981, *T. Wendt 3299, S. Koch, A. Villalobos, J. García et al.* —2 ISOTYPES.

## SALICACEAE

*Populus guzmanantlensis* A. Vázquez & Cuevas, Acta Bot. Mex. 8: 39. 1989.—**Mexico.** JALISCO: Mpio. Casimiro Castillo, 1–2 km al NE de Casimiro Castillo, 19°37'20"N, 104°25'15"W, 400–500 m, 4 Oct 1988, *R. Cuevas & L. Guzmán 3224*.—ISOTYPE.

## SCROPHULARIACEAE

*Castilleja chlorosceptron* G. L. Nesom, Phytologia 73: 137. 1992.—**Mexico.** DURANGO: Mpio. Canelas, on the road to Topia and Canelas, 6 km E of Canelas, 30 km E of junction of this road with road to Topia (at Cuevecillas), 1770 m, 29 Jun 1992, *R. Spellenberg 11059 & J. Bacon*.—ISOTYPE.

*Castilleja gonzalezae* G. L. Nesom, Phytologia 76: 465. 1994.—**Mexico.** DURANGO: Mpio. El Mezquital, 33 km de La Guajolota, por el camino a Platanitos, 2220 m, 16 Mar 1985, *M. González 1693*.—ISOTYPE.

*Mimulus minutiflorus* Vickery, Madroño 4: 392. 1997.—**Mexico.** DURANGO: Km 165.5 in Mexico Hwy 40, in ephemerally moist, sunny areas, 2220 m, 12 May 1976, *R. K. Vickery, Jr. 2901*.—ISOTYPE.

*Mimulus yecorensis* Vickery, Madroño 4: 391. 1997.—**Mexico.** SONORA: 17 km E of Yecora on Mexico Hwy 16, on mossy banks of small stream in the pine forest, 26 Apr 1982, *D. A. Polhemos s.n.*—ISOTYPE.

## SYMPLOCACEAE

*Symplocos citrea* Lex. in La Llave & Lex., Nov Veg. Descr. 1: 22. 1824.—**Mexico.** MICHOACÁN: Mpio. Morelia, Ichaqueo, *H. Díaz Barriga 7260*.—ISONEOTYPE. [Neotype designated by Díaz-Barriga and Cházaro, Acta Bot. Mex. 23: 43. 1993.]

## THYMELAEACEAE

*Dirca mexicana* G. L. Nesom & Mayfield, Sida 16: 459. 1995.—**Mexico.** TAMAULIPAS: Mpio. Hidalgo, along road from Sta. Engracia (Tamps.) to Dulces Nombre (N. León), Arroyo Oscuro, 2.0 road mi NE of Los Caballos toward Canada El Mimbre, 15.0 road mi W of lowermost crossing of arroyo El Mimbre, 23°59'09"N, 99°28'37"W, ca. 1800 m, 3 Mar 1995, *G. L. Nesom 7863 with M. Mayfield, G. Anderson*.—ISOTYPE.

Contr. Univ. Michigan Herb. 24: 127–171. 2005.

# MARCUS E. JONES IN MEXICO, 1892

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ABSTRACT. Marcus E. Jones was a recognized expert on the Flora of the western part of the United States, and a self-taught geologist, when in 1892 he was commissioned to travel on the Pacific side of Mexico, to look into potential sites for the exploitation of minerals and the possibility of building new railroads to those sites. In his spare time, from mid-April until mid-July, he collected herbarium specimens to a total of about 750 gatherings in several duplicate sets. His collection as a whole is important because he was the first botanist to gather significant samples from a series of localities in south-central Jalisco and adjacent Colima. The primary set of specimens, those from Jones's private herbarium, now housed at Rancho Santa Ana (RSA-POM), have been somewhat neglected by contemporary specialists.

## INTRODUCTION

Marcus Eugene Jones (1852–1934) was a brilliant, opinionated, controversial, careless, and difficult man who, in the words of his biographer Lee W. Lenz (1986), "above all else [he] was a superb field botanist who traveled over more of the West and for a longer period of time than any other botanist of his day, bridging the eras of travel with a team and wagon and that of the model-T Ford." The following summation is also from Lenz (1986, p. 199):

"To understand Marcus Jones it is necessary to recognize certain facts: he abhorred pretension, deception and pomposity, and was strictly truthful as he understood the matter. To him everything was right or wrong, black or white, true or false, there was no place in his life for shades of gray and he had little use for the views of others with whom he disagreed. He was also prone to exaggeration and was given to making sweeping and sometimes unguarded statements, often expressing himself in an unnecessarily crude or caustic manner."

## EARLY INTEREST IN BOTANY

Jones was interested in plants from the time of his childhood in Iowa. He attended Iowa College (later Grinnell College), where he became proficient in Latin and probably (Lenz 1986, pp. 16, 17) took the classical course of study, which included English, Latin, Greek, Sanskrit, and Anglo-Saxon, as well as geography, mathematics, and "natural philosophy." He graduated in 1875 and continued his studies, concentrating on Latin, until 1878, when he was awarded the degree of Master of Arts.

While he was in college, Jones began in earnest to collect the local plants in quantity and support himself at least in part by selling sets of duplicate herbarium specimens. By 1878 he was offering sets of 500 species of Iowa plants, which he sold for twenty dollars per set. In the summer of 1878 he moved his base of operations to Colorado, and at about the same time he established an arrangement with an Austrian, Karl Keck, who wanted sets of Western plants to sell in Europe. Jones returned to Grinnell in October, reportedly (Lenz 1986, p. 24) with 40,000 specimens, and spent the winter identifying his specimens and making up sets to send to Keck.

For the next few years Jones continued his plant-collecting (along with other activities) in the western States, particularly in Utah, Nevada, California, and Arizona, and also in Baja California. Beyond botany, as early as 1884 his writings began to reflect a concern about the economic development of Utah Territory and the geologic implications of this (Lenz 1986, p. 70). His geological expertise evidently continued to increase, as by 1888 he was being consulted about the validity of mining claims in Utah. He was consulted by the Territorial governors of Utah and Arizona on matters relating to the water supply and the reclamation of arid lands, and increasingly he became known as a reputable geologist.

His botanical work was treated with some respect by his contemporaries, particularly for the enormous energy he showed as a field-collector. Although some botanists were patient with his requests for identifications of his "new" discoveries in the relatively unexplored "West," he became increasingly frustrated by what he took to be a condescending attitude on the part of the "Eastern establishment." He felt that the "Eastern" botanists, especially those at New York and at Harvard, looked down on his work on "Western" plants, although they had had little or no field-experience with them and did not understand the geographical implications as he did. Perhaps unduly influenced by his prejudices, and always highly confident of his own abilities, he turned more and more toward identifying his own plant-specimens before making them up into sets of duplicates for sale or exchange.

After about 1890, and several papers in the Brandegees' short-lived journal *Zoe*, and elsewhere, Jones began to edit and publish his "Contributions to Western Botany" (the later ones printed on his own press), which made altogether a sizeable volume, 18 papers devoted first and foremost to the publication of the names and descriptions of new species. According to Lenz (1986, p. 237) Jones published the "relatively modest number" of about 793 taxa between 1881 and 1933. "Relatively modest" was in comparison with some of Jones's contemporaries, e.g., Thomas Howell (who was credited with 3290 new taxa), E. L. Greene ("some 3000 new taxa"), Wm. Suksdorf (1690), and Aven Nelson (849).

During the first part of his career, Jones concentrated geographically on the Great Basin of the western United States. When still relatively young he became well known as an expert on the floras of the western states, partly through the distribution of multiple sets of his specimens. At the same time he gradually became known as a field geologist. Late in his life he developed an interest in the vascular flora of Mexico, and undertook special collecting trips to the western part of the mainland in 1926, 1927, 1928 and 1930. His published papers, especially the later ones like his 18th *Contribution to Western Botany* (1933) show that he studied the collections in depth and identified most of them to his own satisfaction, but not always to the satisfaction of others.

## COLLECTING IN MEXICO, 1892

In 1890 (Lenz 1986, pp. 77, 91) Jones was approached by Gen. W. J. Palmer, who after the American Civil War had returned to private life and become "one of the most enterprising of the early Western railroad men," who also organized and developed a number of mining towns along the railroads. Among his accomplishments was the successful completion of the Mexican National Railway from Laredo to Mexico City. Jones did some work for him in 1890 and 1891. On April 7, 1892, Jones [while in Salt Lake City] received from Gen. Palmer a telegram asking him to go immediately to Mexico "to make an examination of Sierra Mojada, Zacatecas, Guanahuato [sic],

and the properties along the Mexican Nat[ional] R. R. from Irapuato to Manzanillo." Another version, in Jones's own words (Lenz 1986, p. 91) says that on this trip he was to study the mines and ore production of the leading mining camps in [western] Mexico and report on them for three proposed railroad routes. His first destination was the established mining district at Sierra Mojada in far-western Coahuila.

According to Lenz (1986, p. 93) Jones wrote of the 1892 collections, "[J. N.] Rose named most of them. I put up three sets, one at the U.S. National [Herbarium], one my own, and I presume the third [to be at the]Missouri Botanical Garden." [There is also a substantial set at MSC, the herbarium of Michigan State University, East Lansing.] His private herbarium, including the undistributed part of his own set of the 1892 plants, was acquired by Pomona College in 1923. A survey conducted during the latter part of the year 2003 shows that perhaps four-fifths of the numbered gatherings are still represented at POM-RSA, but a very large number of these have never been more than casually identified, and many have been grossly misidentified by Jones or someone else. If Rose actually named a large percentage of the specimens, Jones must have felt it was superfluous to go back at the time and make his own decisions on their identities.

Because of his obligation in 1892 to his (geological) sponsor, the hours when he could "botanize" were limited. In spite of that he managed to amass a botanical collection of some 750 gatherings, the majority of them with several duplicates. He collected specimens from about 30 localities. The counts listed below are presumably smaller than the actual totals, as no more than four-fifths of Jones's numbers have been located at POM or elsewhere. The importance of his botanical collections derives from his established practice of trying to "collect the whole flora" at each locality (as he said of himself), and secondly because he was the first (and often the last) collector to visit the localities in question. On the upper slopes of the Nevado de Colima, for example, where he preceded by one year the great collector of Mexican plants, C. G. Pringle, Jones made at least 85 gatherings in two days, including many alpine and subalpine species.

The numbered collections of 1892 include *at least* 85 from the massif of the Nevado de Colima (Jal.), 75 from the Sierra Mojada (Coah.), 65 from La Palma (Jal.), 50 from Chiquilistlán (Jal.), 45 from Santa Cruz (Jal., near Tapalpa), 40 from Colima (Col.), 30 from Ojo Caliente (Zac.), and at least 25 from each of the following: Pihuamo (Jal.), "Sacoalco" (Jal.), Tapalpa (Jal.), Ferrería de Tula (Jal.), Manzanillo (Col.), and what Jones called the Rio Cuvianes (Jal., Col.). At the end of the trip Jones numbered the collections, sent some of them to specialists for determination, named the others as best he could and sent out several sets of the duplicates to his customers.

Authors of recent monographic studies of Mexican genera or families of plants have mostly overlooked the Pomona herbarium, which remains a valuable source of information about the vascular flora of south-central Jalisco and adjacent Colima as it was a little more than a century ago.

As far as I can determine, Jones paid little attention to his 1892 collections after his first distribution of some of the sets. At that time he had no particular interest in the flora of Mexico, except that he had done some plant-collecting in the arid northwest. In the years 1892–1893 his interest was still primarily in the Great Basin and adjoining areas. It seems that he was also too busy with other matters to go back to the details of his Mexican collection. Furthermore, in 1892 his primary responsibility was to search for potential sites where ores might be exploited profitably and for potential railroad routes to these sites. As McVaugh (1972, p. 352) noted, "In the typewritten itinerary prepared by Jones...and now at Pomona College, he said [p. 21]:

botany was a side issue and I had to get specimens as my other business would allow. For this reason I got only about 5 specimens of a kind, and never could work up a flora as was my wont." [See above for a slightly different version of this story].

Jones kept a diary during most of his field excursions, and later dictated a chronological account of his travels and exploration, which was published [Leafl. West. Bot. 10 (no. 12): 193–236. 29 Nov 1965] under the title of *Botanical Exploration of Marcus E. Jones, 1876 to 1919: an Autobiographical Account.* This was apparently a version of what Lenz (1986, p. 11) cited frequently in abbreviated form (as BM), and called "the best of the autobiographical accounts but flawed by errors of fact and transcription and [which] must be used with caution."

By 1893 Jones had begun to be absorbed in his long-time study of *Astragalus,* and much of his attention must have been devoted to the preparation of his papers for *Zoe* that were published in that year. In 1894 he spent the field season (March to October) in Utah, where he was employed as a "Special Field Agent" of the U.S. Department of Agriculture (Lenz 1986, pp. 253–290). By that time his two-year-old Mexican collections must have been low on his list of priorities, where they subsequently remained, with few exceptions.

## NUMBERING OF THE 1892 COLLECTIONS

Jones made a practice throughout his career of collecting several or many duplicate examples of each gathering and arranging these in sets for sale. Many of his collections from the earlier years were not serially numbered, or at least the numbers were not mentioned in publication (see Lenz, 1986, pp. 403–465, "New Taxa Described by Jones"), but beginning with the Mexican trip of 1892 he eventually gave numbers to most of the gatherings, though he seems to have attached little importance to this.

The numbering of the collections of 1892 is of some general interest. Now, at the beginning of the 21st Century, scientifically-inclined collectors generally number their gatherings serially and chronologically, beginning with No. 1 and continuing a lifetime series as a unique record. Such a series constitutes a valuable historical source for subsequent investigators who may need to know the exact whereabouts of the collector in time or space, or both. In 1892 the numbering of collections was already a long-established practice, but individual collectors often began their numbering anew with each field-season, and editors (who often were the same botanists that had named the plants) felt free to disregard these "field numbers" and assign new numbers based on some preferred "Natural System" of classification. A victim of this latter method was the great collector Charles Wright, whose work with the Mexican Boundary Survey was described by Asa Gray in two good-sized volumes (Gray 1852, 1853), but whose precise dates and collecting localities were mostly unknown until they were elucidated by Elizabeth Shaw (1987) on the basis of Wright's field-numbers as he had recorded them elsewhere.

For more than 30 years (ever since I began to notice Mexican specimens collected in 1892 by Marcus E. Jones and housed at US, MO, MSC or GH, or when I noticed citations of such specimens in the literature of systematic botany), I have been "keeping book" on this collection as a part of the record of botanical exploration in Nueva Galicia. I published a general paper on the latter (McVaugh 1972), in which three pages of text were devoted to Jones's trip of 1892, and included a transcript of his diary from 22 May through 18 July. At that time my record of the collections

made by Jones was very incomplete—only about one quarter of the numbered collections had surfaced and most of the numbers were between 1 and 500, although in memoranda Jones recorded that his collection included numbers as high as 752, and I had seen no. 769. About half of the available information was in a list of collections accessioned at the U.S. National Herbarium (US), which came to me through the kindness of George Russell.

In August 2003 I enlisted the help of Curator Steve Boyd at RSA-POM. He very kindly suggested the name of a member of the herbarium staff, Lisa M. Rojas, who spent many hours during the rest of that year and into the next, searching for the original set of specimens from Jones's herbarium, recording the data on each one, and making digital images of the specimens for my study. Thanks chiefly to Ms. Rojas, and also to Michael Denslow and Gary Wallace, we now have a record of about four-fifths of the numbers, including many of the higher ones (above 500).

Before the receipt of the data gathered by Ms. Rojas and collaborators, I had no reliable way to guess how the numbers were assigned to the Jones collections of 1892. The first hundred numbers, seemingly chosen at random, include several dated as of 19 April, when Jones began to collect in Coahuila, several from 13 July when he was on his way home to Utah, and many from intervening dates and unrelated localities in May and June. This seems effectively to rule out a strictly chronological arrangement, and gives no clue to any other arrangement.

One principal scenario suggests itself. While Jones was in the field, traveling on foot or by wagon, or on muleback, botanizing when he could find the time, camping in open mountainous country, trying to collect in several sets, make sure the specimens were dried expeditiously (even during rainy periods) and preserved thereafter, he had neither the time nor the facilities to consider making labels as he went along, or even to arrange the specimens in any way. It seems likely that the most he could do was to bundle up his specimens from each locality as soon as they dried, and write the locality and date on each bundle.

When Jones returned to the United States (perhaps to the National Herbarium in Washington, D.C., where J. N. Rose "named most of them"), there must have been a grand opening of 25 to 50 or more bundles, and a beginning of random numbering, perhaps after the selection of a sample of species and genera already known to Rose (or to Jones), or for submission to a specialist

The numbers from one to eleven (no. 3 is missing and no. 2 is applied to two different species) include, in order, members of the families Clethraceae, Myrsinaceae, Leguminosae, Valerianaceae, Polygonaceae, Dioscoreaceae, Piperaceace, Melastomataceae, Capparidaceae, Loranthaceae, and Malpighiaceae. This seems to rule out the better-known Natural Systems of classification as bases for numbering Jones's collections.

On the other hand, the numbers from 128 to 138, from seven different localities and collected on seven different days, are all members of the Rosaceae except no. 132 (a species of *Casearia* in the Flacourtiaceae) and no. 133 (*Ximenia parviflora* in the Olacaceae), either of which might have been taken by Jones as "rosaceous." Further, the specimens from No. 141 to 216 are all members of the Leguminosae, except for about six scattered through the long series. Soon it must have become evident to Jones that in families like the Leguminosae there were so many specimens that it would be most efficient to sort the entire collection by plant-family and proceed with the identifications, species by species, without having to repeat the labor of keying out the same species more than once.

Once the entire collection had been sorted to the family level, it would have been comparatively simple to arrange the bundles and assign numbers more or less

in accord with a system like that used by J. M. Coulter in his contemporary "Botany of western Texas" (Contr. U.S. Natl. Herb. 2: [i–iv], v, 1–588. 1891–1894). A scan of the list of Jones's collections shows that the numbers follow Coulter's system rather closely (although with many unusual intercalations) until the end of the Pteridophytes at No. 542.

Notable are the Cactaceae, which were numbered 239 to 258; the Euphorbiaceae (nos. 411–435 including some misidentifications), the showy-flowered Monocots (nos. 447–473), and ferns or fern-allies (nos. 497 to 542, except for a few scattered numbers; the dates of collection ranging from 19 April to 13 July).

I suspect that this concluded the numbering of the collections of 1892 that were to be distributed in sets. It is not clear why Jones discontinued the sorting (if that is really what he did), with some 200 numbers still unlabelled and mostly unstudied.

Labels for numbers below No. 550 are commonly typed or (except for the name of the plant) handwritten by Jones himself. Above no. 550 I have noted no more than two (Nos. 592, "Lake near San Miguel, 6 May" and 643, "Rio Cuvianus Tuxpan") that are in the hand of Jones. There may be others, of course, among the specimens that have not been recovered.

Among the higher numbers various unrelated specimens from a single locality are mostly grouped in short or long series, e.g., nos. 550–567 are apparently all from Ojo Caliente, Zac., where Jones collected on the 9th of May, and nos. 601–638 are apparently all from the Sierra Mojada, Coahuila, 19–21 April. The labels on these are mostly in the hand of P. A. Munz, evidently copied from original notes by Jones, and the locality is variously written (as Jones may well have labelled his bundles) as "Sierra Mojada Mts.," "Sierra Mojada, Mex.," "Mojada, Mex." or merely "Mojada." Nos. 685–700 (as far as these have been recovered) are dated either 13 or 14 July, with locality written as "Volcano of Colima," "Nevado de Colima," or "Volcan, Mex.," and the data again are in the hand of Dr. Munz. Similarly, nos. 735–753 (as far as known) are dated 7, 8, or 9 June, all in the hand of Munz, all from La Palma, Jalisco. The supposition is that when the Jones herbarium came to Pomona College, Dr. Munz took upon himself the work of finishing the labelling that Jones had left unfinished at his untimely death.

## MEXICAN COLLECTIONS, 1926–1930

Jones was 74 years of age when in 1926 he began a series of four major collecting trips that resulted in many hundreds of Mexican specimens and a large number of new taxa based on his own collections. His itineraries in 1926, 1927, 1928, and 1930 were summarized in tabular form by Morton (1945, pp. 89–91, q. v. below). McVaugh (1972, pp. 252–253) published a brief narrative summary of Jones's work in Nayarit and Jalisco in 1927 and 1930. His work in Mexico in 1892 has mostly gone unnoticed, except for the publication of excerpts from his diary from May 22 to July 18, the period of his stay in Nueva Galicia (McVaugh 1972, pp. 250–252).

The great majority of the miscellaneous new names published by Jones for Mexican plants first appeared in his *Contribution* no. 18 (1933), and earlier in smaller numbers in *Contributions* no. 12 (1908), and no. 15 (1929). His work on the Mexican flora was examined in detail in a pair of substantial papers published in 1945 by two well-regarded authors (Morton, C. V. Mexican phanerogams described by M. E. Jones, Contr. U.S. Natl. Herb. 29: 87–116; Blake, S. F. Asteraceae described from Mexico and the southwestern United States by M. E. Jones, 1908–1935, Contr. U.S. Natl. Herb. 29: 117–137). Both Morton and Blake were primarily concerned with the Jonesian type-specimens, and

the identities of new names proposed by Jones and based on his own material. Both authors dealt in detail with Jones's Mexican collections from 1926 to 1930. Neither Blake nor Morton, unfortunately, nor Jones himself, studied in detail the first large collection that Jones made on the mainland of western Mexico in 1892. Relatively few types have been found among the 1892 collections.

The papers by Blake and Morton include many critical notes, and Blake's contribution is noteworthy for its long discussions on geographical and nomenclatural points. Both authors felt free to point out the shortcomings of Jones's work. Blake (op. cit. 121) was inclined to blame "Jones' inability to identify his own material from a region with which he was not familiar, [so that] every one of the 25 allegedly new species of Asteraceae he described from his 1930 collection in Jalisco is a synonym of an older species, as is also the single species from his 1892 collection, and…12 of the 26 were described by him under wrong genera, in two cases in wrong tribes, in 6 others in wrong subtribes."

Morton's comments (1945, p. 87), severe to the point of harshness, are relevant here: "Jones' herbarium and library facilities were not wholly adequate for work on the Mexican flora, and his previous experience had scarcely qualified him for critical research on tropical or subtropical plants. It seems likely, moreover, that his eyesight was not very good at the time, for there is little evidence in his descriptions that careful dissections were made for any of his new species. Consequently, it is no surprise to find that his work on the Mexican flora is poor…" [Editorial comment by McVaugh, 2004: It may well have been true that Jones had some diminished vision as he neared 80 years of age, from 1926 to 1930, but no such a deficiency is evident in his earlier papers. His name *Calamovilfa poaeformis*, for example (Contr. West. Bot. 14: 9. 1912, based on *Jones 478a* (POM 115352), was ostensibly a new combination based on *Cinnastrum poaeformis* Fourn. (Pl. Mex. 2: 90, ex descr. 1886), but Jones made clear that although he had taken up the epithet from Fournier's, "description…my species shall rest on my characters given below"; to this he added a very detailed 16-line description].

As I read this, looking back from almost 60 years after Morton and Blake (1945) enumerated the very large numbers of errors made by Jones, and having the insight on Jones's character that was provided by Lenz, it is not unreasonable to suppose that when Jones went over his own collections in some haste, and found something unfamiliar to him, he decided it must be new. Exactly the same story has gone the rounds with reference to E. D. Merrill and P. C. Standley, with the difference that each of them was already a recognized world-expert on the flora he was studying.

## TENTATIVE LIST OF NEW NAMES BASED ON MEXICAN COLLECTIONS RELEVANT TO THOSE MADE BY MARCUS E. JONES IN 1892

**Apium depressum** M. E. Jones, Extr. from Contr. West. Bot. 18: 63. 1933. Lake near San Miguel, Zac., 6 May, *M. E. Jones s.n.* (POM 82793, holotype). = *Apium leptophyllum* (Pers.) F. Mueller ex Benth. & F. Muell., fide Mathias & Constance, N. Amer. Flora 28B: 129. 1944.

**Arracacia tapalpae** M. E. Jones, Extr. from Contr. West. Bot. 18: 62. 1933. Ferrería de Tula, Tapalpa Mts., Jal., 28 May, *M. E. Jones s. n.* (POM 82990, holotype). = *Tauschia nudicaulis* Schltdl., fide Mathias & Constance, N. Amer. Flora 28B: 83. 1944.

**Asclepias senecionifolia** M. E. Jones, Contr. West. Bot. 12: 49. 1908. Santa Cruz, near Tapalpa, Jal., 14 June, *M. E. Jones s. n.* = *Asclepias rosea* H. B. K., fide Woodson, Ann. Missouri Bot. Gard. 41: 150 1954.

**Asclepias constricta** ["contstricta"] M. E. Jones, Contr. West. Bot. 12: 49. 1908. Volcano of Colima, Jal., 13 July, and at Tapalpa, Jal., June 10, *M. E. Jones 318* (type, MO, fide Woodson, 1954). = *Asclepias pringlei* (Greenm. ) Woodson, fide Woodson, Ann. Missouri Bot. Gard. 41: 111. 1954.

**Asclepias exilis** M. E. Jones, Contr. West. Bot. 12: 48. 1908. Pastorilla, Zac., 2 May, *M. E. Jones s. n.* [*no. 568*], (type, MO, fide Woodson, 1954; POM 76066). = *Asclepias scaposa* Vail, fide Woodson, Ann. Missouri Bot. Gard. 41: 94. 1954.

**Asclepias jaliscana** M. E. Jones, Contr. West. Bot. 12: 49. 1908 (non *Asclepias jaliscana* B. L. Rob. 1894). Chiquilistlán, Jal., 28 May, *Jones s. n.* (type, MO, fide Woodson, 1954; POM). = *Asclepias angustifolia* Schweigger, fide Woodson, Ann. Missouri Bot. Gard. 41: 62. 1954.

**Asclepias tapalpana** M. E. Jones, Contr. West. Bot. 14: 35. 1912. *Asclepias jaliscana* Jones (1908), non *Asclepias jaliscana* B. L. Rob (1894)

**Astragalus diphacus** var. **peonis** M. E. Jones, Contr. West. Bot. 10: 65. 1902. Zacatecas, 16 May, *M. E. Jones s. n.* (POM, holotype). = *Astragalus diphacus* S. Watson [probably], fide Barneby, Mem. N. Y. Bot. Gard. 13: 1124. 1964.

**Astragalus racemosus** var. **brevisetus** M. E. Jones, Proc. Calif. Acad. Sci. II. 5: 662. 1895. Ramos, Zac., [=S. L. P.] 5 May, *M. E. Jones s. n.* (POM, holotype). = *Astragalus racemosus* var. *racemosus*, fide Barneby, Mem. N. Y. Bot. Gard. 13: 416. 1964.

**Bursera jonesii** Rose, Contr. U.S. Natl. Herb. 3: 314. 1895. Near the city of Colima, Col., 2 July, *M. E. Jones 73* (US, holotype). = *Bursera schlechtendalii* Engler, fide McVaugh & Rzedowski, Kew Bull. 18: 361. 1965.

**Calamovilfa poaeformis** M. E. Jones, Contr. West. Bot. 14: 9. 1912. Volcano of Colima, Jal., among pines on the slopes, 13 July, *M. E. Jones 478a* (POM 115352, holotype).—The name was ostensibly based on *Cinnastrum poaeformis* Fourn., Pl. Mex. 2: 90, ex descr. 1886, but Jones stated, "... from the description, but my species shall rest on my characters given below," i.e., a very detailed 16-line description. This creates an unusual nomenclatural situation in which an author describes and typifies a new species but gives it a name that he thinks may or may not apply to it.

**Cercocarpus mojadensis** C. K. Schneid., Ill. Handb. Laubholzk. 1: 530. 1905. Sierra Mojada, Coah., 19 April, *M. E. Jones 134* (MO, holotype).—According to James Henrickson (in litt. 2003), this collection appears to be a desert derivative from *Cercocarpus fothergilloides* H. B. K. with many specimens showing intermediate vestiture.

**Cleome chapalaensis** Iltis, Bol. Inst. Bot. Univ. Guadalajara Epoca III. 5: 428. 1998. N of Zamora, Mich., road to La Barca, 29 July 1960, *H. H. Iltis et al. 490* (WIS, holotype).—According to Iltis (1998, p. 421, the first specimen of this species

ever collected (but unfortunately unrecognized *in herbario* for a century), was from "Sacoalco" [Zacoalco de Torres, Jal.], collected 16 July 1892 by M. E. Jones (no. 576, POM 93793).

**Dioscorea mitis** Morton, Publ. Carnegie Inst. Washington 461: 247. 1936. Pihuamo, "Mich." [=Jal.] 16 June, *M. E. Jones 6* (US 337885, holotype).—This is a little-known but apparently distinct species, recognizable either from staminate or pistillate material (fide McVaugh, Flora Novo-Gal. 15: 374. 1989, a decision in which the late Bernice Schubert concurred).

**Ficus jonesii** Standl., Contr. U.S. Natl. Herb. 20: 31. 1917. La Palma, Jal., 7 June, *M. E. Jones 33* (US 237888, holotype). = *Ficus glycicarpa* (Miquel) Miquel, fide Quintana & Carvajal, Bol. Soc. Inst. Bot. Univ. Guadalajara 8: 16. 2001 (without citation of type).

**Fraxinus nummularis** M. E. Jones, Contr. West. Bot. 12: 59. 1908. Sierra Mojada, Coah., 19 April, *M. E. Jones s. n.*; Lenz (1986, p. 439) says "Type POM."—Standley (Contr. U.S. Natl. Herb. 23, part 4: 1135. 1924) accepted this as a valid species, but said "It seems probable that this is a form of *F. greggi* having [in the type specimen at US] all the leaves simple and oval."

**Hymenocallis jaliscensis** M. E. Jones, Extr. from Contr. West. Bot. 18: 33. 1933. Salcillo, Jal., 1 June, *M. E. Jones 458* (POM 119358, lectotype chosen by Traub & Vickery, Plant Life 12: 43–44. 1956).—With advice from the monographer of the genus, James A. Bauml, McVaugh accepted this as a valid species with restricted range in Nayarit and Jalisco (Flora Novo-Gal. 15: 214. 1989).

**Ionoxalis macrocarpa** Small, N. Amer. Flora 25: 41. 1907. La Palma, Jal., 9 June, *M. E. Jones 117* (US, holotype). = *Oxalis macrocarpa* (Small) Knuth, fide Denton, Publ. Mus. Michigan State Univ. Biol. Ser. 4: 575. 1973.

**Ionoxalis tenuiloba** Rose, Contr. U.S. Natl. Herb. 10: 115. 1906. Colima, Col., 2 July, *M. E. Jones 118* (US, holotype).—Rose commented in the protologue (p. 115), "This species has very remarkable leaflets." The leaflets are, as he described them, "deeply 2-lobed," and the lobes "strongly divergent, linear, 2.5 to 5 cm long, acute." Denton (Publ. Mus. Michigan State Univ. Biol. Ser. 4: 566. 1973.), without comment, reduced *I. tenuiloba* to the synonymy of *Oxalis latifolia* H. B. K., though she said (p. 567) of the latter, "leaflets obcordate, lobed up to one-half their length."

**Lupinus reflexus** Rose, Contr. U.S. Natl. Herb. 8: 309. 1905. Nevado de Colima, Jal., 13 July, *M. E. Jones 204* (US, holotype).—This is apparently a distinct high-montane species (cf. Flora Novo-Gal. 5: 591. 1987).

**Malpighia cordata** Small, N. Amer. Flora 25: 154. 1910. Sacoalco, Jal., 16 July, *M. E. Jones 27* (US 236896, holotype).—W. R. Anderson (in litt. 2003) informs me that this is probably a form of the variable *Malpighia mexicana* Adr. Juss. but conceivably distinct.

**Phaca zacatecana** Rydb., N. Amer. Flora 24: 352. 1929 [non *Astragalus zacatecanus* (Rydb.) Barneby, 1964]. Casualidad, Zac., 26 Apr, *M. E. Jones s. n. [no. 146]* (NY, holotype). = *Astragalus wootonii* var. *candollianus* (H. B. K.) Barneby, fide Barneby, Mem. N. Y. Bot. Gard. 13: 870. 1964.

**Pityrogramma tartarea** var. **fallax** Domin, Věstn. Král. České Společn. Nauk, Tř Mat.-Přír. 1941(15): 8. 1942. San Marcos, [Jal.]. 21 June, *M. E. Jones 513a* (POM 121273, isotype, so annotated by C. V. Morton, 1969; the holotype was lost in WWII).

**Quercus crenatifolia** Trelease, Mem. Natl. Acad. Sci. 20: 57, *pl. 52*. 1924. Chiquilistlán, Jal., 28 May, *M. E. Jones 440* (MO, holotype). = *Quercus obtusata* Humb. & Bonpl., fide McVaugh, Flora Novo-Gal., Contr. Univ. Michigan Herb. 12, part 1, no. 3: 60. 1974; González Villarreal, Género *Quercus* en Jalisco, Inst. Bot. Univ. Guadalajara Coll. Flora de Jal. 1: 145. 1987.

**Quercus jonesii** Trelease, Mem. Natl. Acad. Sci. 20: 136, *pl. 257*. 1924. Chiquilistlán, Jal., 28 May, *M. E. Jones 446* (US, holotype). = *Quercus coccolobifolia* Trel., fide McVaugh, Flora Novo-Gal., Contr. Univ. Michigan Herb. 12, part 1, no. 3: 25. 1974; González Villarreal, Género *Quercus* en Jalisco, Inst. Bot. Univ. Guadalajara Coll. Flora de Jal. 1: 52. 1987.

**Quercus serrulata** Trelease, Mem. Natl. Acad. Sci. 20: 179, *pl. 361*. 1924. Chiquilistlán, Jal., 28 May, *M. E. Jones 445* (US, holotype). = *Quercus castanea* Née, fide McVaugh, Flora Novo-Gal., Contr. Univ. Michigan Herb. 12, part 1, no. 3: 21. 1974; González Villarreal, Género *Quercus* en Jalisco, Inst. Bot. Univ. Guadalajara Coll. Flora de Jal. 1: 40. 1987.

**Raimannia colimae** Rose, Contr. U.S. Natl. Herb. 8: 330, nom. illegit. 1905; Rose ex Sprague & Riley, Kew Bull. 1921: 200. 1921. (The generic name *Raimannia* was not validly published until 1913). Volcano [of] Colima. Jal., 14 July, *M. E. Jones 232* (US, holotype). [=*Oenothera pubescens* Willd. ex Spreng., Syst. Veg. 2: 229. 1825, or *Oe. laciniata* var. *pubescens* (Spreng.) Munz, fide Munz, Amer. J. Bot. 22: 656. 1935].—In many recent treatments the montane *Oe. pubescens*, which grows at elevations from 1500 to 3900 m in western North and South America, has been considered a subspecies of *Oe. laciniata*, which is known primarily at lower elevations in the eastern United States, though widely naturalized elsewhere. Crossing experiments have shown, however, that hybrids between *Oe. pubescens* and *Oe. laciniata* are sterile, and that chromosome pairing at meiosis is irregular. Dietrich & W. L. Wagner (Syst. Bot. Monogr. 88: 73–77. 1988) treat *Oe. pubescens* as a widespread and very variable species and include *Raimannia colimae* as a synonym.

**Salix jaliscana** M. E. Jones, Contr. West. Bot. 12 77. 1908. Ferrería [de Tula], Jal., 28 May, *M. E. Jones s. n.* [*437*] (POM 107135, type).—Standley (Contr. U.S. Natl. Herb. 23, part 1: 160. 1920) recognized this as a valid species, distinguished from *S. bonplandiana* H. B. K. by its dense tomentum, shorter petioles, and shorter staminate aments. E. Carranza González (Acta Bot. Mex. 32: 33–38. 1995), in a paper on the willows of the Bajío and adjacent areas, accepted *S. jaliscana* as distinct from *S. bonplandiana.* George Argus, a specialist in American willows, treated *S. jaliscana* as a synonym of *S. bonplandiana*, without comment (Syst. Bot. Monogr. 52: 52. 1997).

**Tradescantia orchidophylla** Rose & Hemsl., Hooker's Icon. Pl. 26: *pl. 2522*. 1897. In dark wet woods below Colima, Col., 5 July, *M. E. Jones 467* (US,

holotype).—This is apparently a distinct species limited to western Mexico, fide D. F. Hunt in Flora Novo-Gal. 13: 186, *fig. 46*. 1993.

**Vernonia viarum** M. E. Jones, Extr. from Contr. West. Bot. 18: 69. 1933. Chiquilistlán, Jal., 30 May, *M. E. Jones 288*. = *Vernonia deppeana* Less., fide Blake, Contr. U.S. Natl. Herb. 29: 124. 1945. Blake states that "This specimen [presumably the one at US] was correctly identified by Dr. B. L. Robinson, who is quoted by Jones, but Jones nevertheless proceeded to describe it as a new species."

The accounts published by Blake (1945) and Morton (1945) imply an excess of irresponsible "discoveries" of many "new taxa" by Jones over a period of many years, and emphasize his sometimes gross misidentifications of plants from Mexico and elsewhere. The above list of novelties from the collection of 1892 does not suggest that Jones was a "splitter" basing his names on single or trivial characteristics, but that his decisions were sometimes made without adequate study of the literature and of existing herbarium material. In his earlier papers Jones described various new taxa from different parts of Mexico. These do not all show Jones as a poor systematist, rather as a perceptive but idiosyncratic and hasty one. Argus (Syst. Bot. Monog. 52: 52. 1997) treated *Salix jaliscana* as a synonym of *S. bonplandiana* H. B. K., but in the forested arroyos in Jalisco where I have seen it, it does not look like the ordinary drooping willows of stream banks. Standley (Contr. U.S. Natl. Herb. 23: 1135. 1924) accepted *Fraxinus nummularis* as distinct but thought it was probably a depauperate dry-land form of the more widespread *F. greggii* A. Gray. Woodson (in annotations, 1952), relegated four Jonesian species of *Asclepias*, respectively to *A. pringlei* (Greenm.) Woodson, *A. scaposa* Vail, *A. angustifolia* Schweigger, and *A. rosea* H. B. K. The plants described by Jones were not merely individual variants—they were recognized species that already had names. In the 1890s it would have been extremely difficult for Jones (or Rose) to identify four milkweeds correctly.

Of the four species that Jones described in his *Contribution* no. 18 (1933), viz., *Hymenocallis jaliscensis*, *Apium depressum*, *Arracacia tapalpae*, and *Vernonia viarum*, *Hymenocallis jaliscensis* was accepted by Bauml (in McVaugh, Fl. Novo-Gal. 15: 214. 1989). The two umbelliferous species were misidentified, one as to species, the other as to genus. Blake noted (1945, p. 124), that Jones was aware that B. L. Robinson had already named his *Vernonia* specimen no. 288 as *V. deppeana*, but nevertheless proceeded to describe it as a new species.

Lenz pointed out more than once that Jones was not by nature a "splitter," and this is nowhere shown better than by his work on the genus *Astragalus*, which was his major effort.

Jones's monographic work on *Astragalus*, beginning about 1893 and culminating in 1923 in his *Revision of the North-American Species of Astragalus* (288 pages + index, synonymy and plates. Salt Lake City, privately printed), shows that his attitude toward new taxa was not always casual. Rupert Barneby, the most prestigious student of American legume-taxonomy in the 20th century, thought well of it (Mem. N. Y. Bot. Gard. 13: 6. 1964) when he wrote:

> "Jones's Revision initiated a new era in the systematics of *Astragalus*, an era in which the search for natural evolutionary relationships between species and between groups of species began to replace emphasis on similarities in a small, arbitrarily chosen set of morphological characters. The book is full of invaluable information, but is nevertheless an exasperating work. To the novice in *Astragalus* the book is impenetrable [because of the polychotomous keys],

> but to the advanced student it is richly rewarding... In his day Jones knew more about *Astragalus* than any man alive, but a volatile impatience with details of presentation tends to obscure that fact.... *His opinions on [species of] Astragalus, as formulated in the Revision, have almost all been vindicated by subsequent scrutiny*" [emphasis by McVaugh, 2004].

On the other hand, Jones's later floristic papers on a Mexican flora that was unfamiliar to him (Jones 1929, 1933; Blake 1945; Morton 1945), deal with a plethora of what he took to be new taxa. Morton and Blake between them, for example, cited and evaluated 60 (!) new taxa published by Jones (in Extr. from Contr. West. Bot. 18, 1933), the names almost all typified by specimens collected in a period of about two weeks, November 13–28, 1930, in the barrancas near Guadalajara (a few from the vicinity of the nearby RR Station at Orendain). As I stated (1972, p. 253), the specimens had been taken from "one of the best-studied localities in Mexico." The barrancas near Guadalajara had been visited by many competent collectors (e.g., Sessé & Mociño in 1791; Galeotti, 1835–1837; Gregg, 1849; Palmer, 1886; Pringle many times from 1888 to 1908; Rose & Painter, 1903). In 1930–1933, it would have been naïve, or rash, or supremely self-confident, to suggest that 60 taxa (representing about one-eighth of all the collections from that locality) might be new to Science.

Jones's collections of 1892 were never enumerated by him as a unit. As far as I can determine, he proposed about 13 new taxa (including two new varieties) based on those collections, proposals spread out over 40 years. As noted above, it seems that he was too busy with his other preferred research, from 1893 through the nineties and well into the 20th century, to go back and study the details of his 752 Mexican collections (his estimate of the number).

After the the field season (March to October) of 1894 was spent in Utah, where Jones was employed as a "Special Field Agent" of the U.S. Department of Agriculture (Lenz 1986, pp. 253–290), his two-year-old Mexican collections must have been low on his list of priorities, and subsequently remained there, with few exceptions.

## TRAVELS IN MEXICO IN 1892

Jones left Salt Lake for Mexico on April 11, stopped over in Denver and again at San Marcial, Socorro Co., New Mexico Territory, where he bought a map and a Spanish dictionary. He was in Rincón, Doña Ana Co., New Mexico on April 15, at least long enough to collect one specimen (Zoe 3: 291. Jan 1893). He continued toward the Sierra Mojada, Coah., by a branch railroad from Escalón in the southeastern corner of Chihuahua.

He left Escalón at 6 a.m. on the 18th and reached the mines at Sierra Mojada at 10 a.m. He found it very dry there. He walked two miles up to the upper town, "botanized all day" and part of the next, and returned to the junction at Escalón on the 20th, presumably having completed his survey of the mines on the 19th.

Jones's knowledge of Spanish was spotty. He seems to have managed in the Mexican countryside most of the time, but his spelling of place-names and other names was often not one sanctioned by the dictionary. See his Beriazillos or Berrozillos for Berriosabal, Bota for El Bote, *moso* for *mozo*, Pastorilla for Pastoría, Sacoalco and Sapotlan for Zacoalco and Zapotlán, Salcillo for Saucillo and, as recently suggested by Thomas F. Daniel, Linora for La Noria de los Angeles.

During a part of his 1892 trip he had a helper whom he identified only as "Dillon." Lenz (1986, p. 92) says that Dillon was hired as an interpreter. Jones mentioned him in the diary on June 28, when he paid him one dollar. On July 4th it was $2. On

June 30th, and again on July 2nd and July 8th he was paid $5 ("He has become very tiresome"). On the 5th he received $10, on the 7th $32, and on the 9th $50. At this point "Dillon decided to leave me here and return to Mexico, finding at last that he was of no service to me, a fact that I learned a month ago." It would be interesting to know the nature of the original financial arrangement between Jones and Dillon.

According to Lenz (1986, p. 397) Jones reached the city of Zacatecas on April 21, traveling on the main line of the railroad toward the city of Mexico. Figure 1 shows Jones's principal collecting localities in Zacatecas and southward. On the 22nd he visited "the great hacienda or mill below Zacatecas." He collected nos. 578–583 at Zacatecas on April 23 (Lenz 1986, p. 397), but only two of these have been recovered. On the 26th he set out for Casualidad, about 30 km E of Zacatecas near the border between the States of Zacatecas and San Luis Potosí. A railroad line to Casualidad had been proposed but not built, so Jones travelled in a mule-drawn wagon. He arrived in the evening of April 26. He said "It was a region of rolling hills and no vegetation but yuccas and cactus and thorny Leguminosae." He reported visiting the mines on the 27th and in the afternoon "Visited the lead mines (3) of the Potosi Mts. Collected some plants." Cerro Potosí (not to be confused with the very much greater peak of the same name in Nuevo León) is on or very close to the Zacatecas-San Luis Potosí boundary, almost directly east of Zacatecas.

There are few available data pertaining to Jones's next weeks around the city of Zacatecas, a place already long-known for the enormous quantities of silver taken from its mines. Presumably Gen. Palmer was interested rather in new sources of valuable minerals, not excluding silver. Lenz (1986, p. 91) says of Jones, "From [April 21] until May 18, he examined mines and botanized in the general vicinity of the city [of Zacatecas]... He reached Mexico City by train on May 29." We know from Jones's specimens and his diaries, and from an account of his travels that he dictated many years later, that he took a side-trip of about two weeks, beginning from Ojo Caliente (ca. 40 km SE of Zacatecas), into the arid high plains farther east, camping as he said "among the yuccas." In another place he wrote that Ojo Caliente, Pastorilla, Linora, and Ramos are all in the same region southeast of the city of Zacatecas.

In 1892 Ojo Caliente was the last station on a railroad line to the southeast of the city of Zacatecas and a logical place from which to set off for the mining areas further east and southeast, where the States of Zacatecas, Aguascalientes, and San Luis Potosí adjoin. Including Ojo Caliente (Zac.), the localities most often named in Jones's diaries and other papers are Pastoría ("Pastorilla" of Jones), Zac. (about 20 km SE of Ojo Caliente); Ramos, S. L. P.; and "Linora" (I take this to be Jones's version of [La] Noria de Angeles, Zac., which is about 10 km S of El Carro, Zac. El Carro in turn lies about 15 km ["8 miles" according to Jones] E of Pastoría).

As Lenz tells (1986, p. 347), on April 28th Jones was at the "Corkhills mine" and "later all the folks went with us to Las Animas and left us. Then drove to Covison." On the 29th (Jones diary), "Mr. Foreman took me over to La Paz and young Portus [?Portis] showed me through the Covison mine. p.m. drove to Ojo Caliente by 3 p.m." He was in Ojo Caliente, April 29, 30; [presumably on May 1, he], "Rode from Ojo Caliente 15 m. to Pastorilla [Pastoría] by noon where we found much lead... p.m. rode to Linora 15 m." May 2 [he collected] no. 228, no. 568; May 3, rode [from Linora] to Ramos, S. L. P. [the settlement and the mine of the same name], 18 mi from Pastorilla; May 4 rode to Salinas, S. L. P. (SE of Ramos), collected nos. 572–574; he was in Ramos May 5, left Ramos at 7 a.m. on May 6, rode to El Carro, (Zac.), visited the San Miguel quicksilver deposits at San Miguel and at a "lake near San Miguel" collected at least nos. 157 and 585–592, May 6–7; on May 7 left for Pastorilla ca. "8

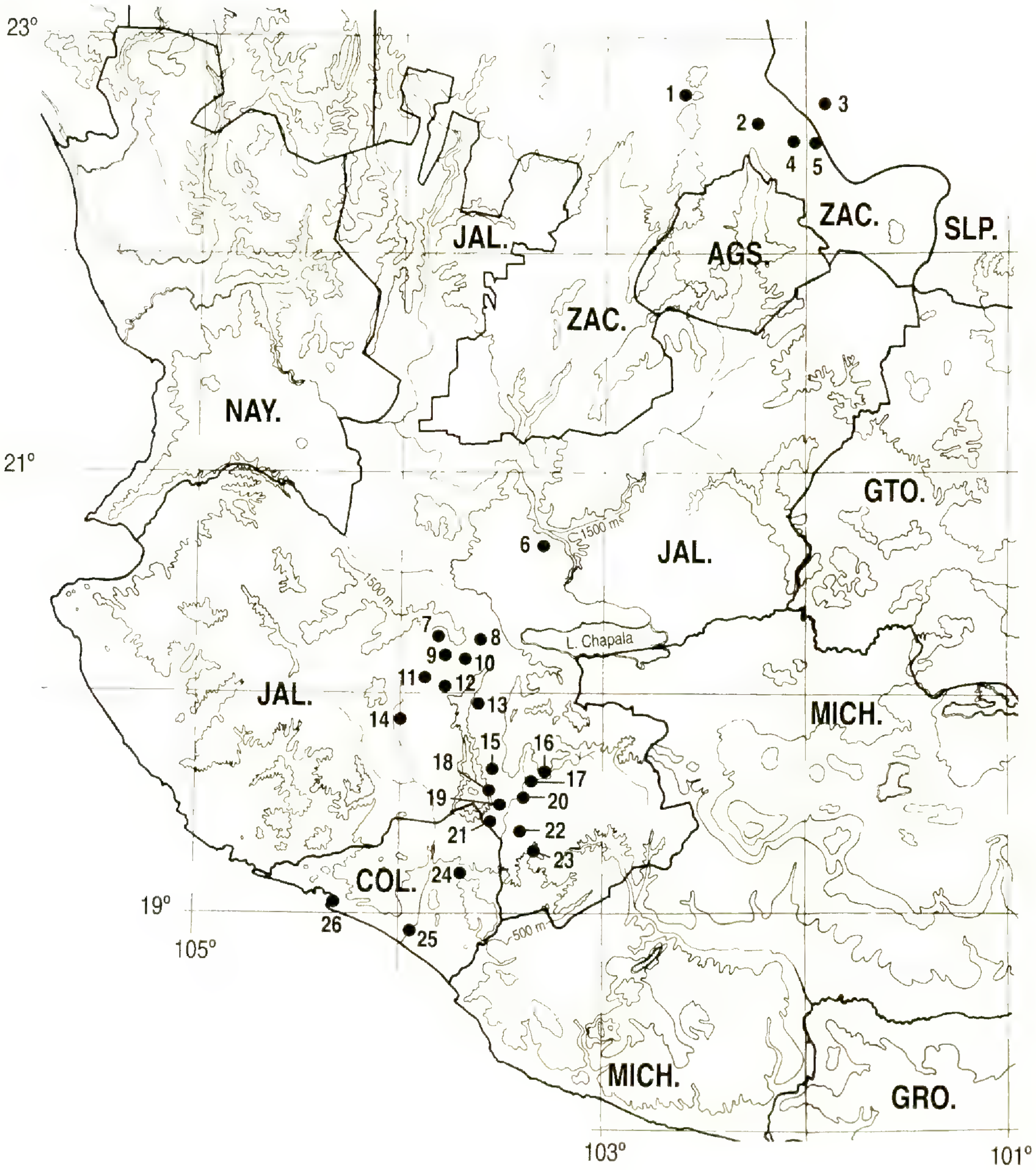


FIG. 1. Principal localities from Zacatecas southward at which Marcus E. Jones collected in 1892.

Numbered localities (all in Jalisco, except nos. 1–5, 24–26)

1. Zacatecas, Zacatecas
2. Ojo Caliente, Zacatecas
3. Ramos, San Luis Potosí
4. Pastoría ("Pastorilla"), Zacatecas
5. El Carro, Zacatecas
6. Guadalajara
7. Saucillo ("Salcillo," "Salsillo")
8. Zacoalco (de Torres) ("Sacoalco")
9. Chiquilistlán
10. Ferrería (de Tula)
11. La Palma
12. Tapalpa
13. Sayula
14. Santa Cruz
15. Zapotlán del Rey ("Sapotlan")
16. Tamazula (de Gordiano)
18. "Volcano of Colima"
17. Santa Cruz #2
19. San Marcos
20. Tuxpan ("Tuzpan")
21. Tonila
22. La Higuera ("Rancho Guerrero")
23. Pihuamo
24. Colima, Colima
25. Armería, Colima
26. Manzanillo, Colima

mi W of El Carro," and on May 9 he was back in Ojo Caliente to collect nos. 151 and no. 158. It would be interesting to know how much time he spent in prospecting for minerals, aside from lead on May 1 and quicksilver on May 6.

On May 9, Jones went to Berriozabal ("Bereazillos"), a station on the main line of the railroad ca. 10–12 km SW of Ojo Caliente [which was not on the main line but the end of track on a parallel line from Zacatecas], "botanized all day" and reached Zacatecas by train at 6 p.m.

Lenz (1986, p. 303) reports that on May 14 Jones was at "Bota" (El Bote, a station on the main line of the railroad), ca. 5 km NW of Zacatecas. On the 15th Jones collected no. 614 (*Nama hispidum*, at POM) at "Santa Rosalia, Mex.," presumably near Zacatecas. Collections from around Zacatecas include no. 585, May 16, and no. 123, June 23. His travels after leaving Zacatecas have been described by McVaugh (1972, pp. 250–252) and by Lenz (1986, pp. 91–93).

Jones travelled by rail from Zacatecas to México, D. F., on May 19. He continued by rail to Irapuato, Gto., where he spent Sunday (May 22) before continuing to Guadalajara, Jal., on the 23rd and Sayula on the 25th. There he stayed for two days, assembling what he needed for an overland pack trip beyond the railroad, "over the Tapalpa Mountains to Chiquilistlán."

Evidently his instructions from General Palmer had indicated some mineral deposits of special importance in the vicinity of Chiquilistlán, which is a small well-established town, 20–25 km north and a little west of Tapalpa and separated from it by high steep forested ridges. In Sayula Jones hired a "moso" [*mozo*; a muleteer; an *arriero*] and 4 mules and set out for Tapalpa at 6 a.m. on the 27th. As he said, "the ascent to 9000° on the mts. is steep" [but his estimate of the altitude was high—the road-summits are closer to 7000 feet (2100–2200 m)]. Sayula lies below, at the level of a series of shallow and seasonally dry lake-beds, and even now the improved road to the forested mountains around Tapalpa is very steep and tortuous. Evidently Jones reached Tapalpa by midday. He went to the nearby rancho of Ferrería [de Tula] [some 12–15 km northeast of Tapalpa] "in p.m. Saw the good iron works at Ferrería. Slept there. The manager was very kind."

On the following day (May 28) Jones left Ferrería for Chiquilistlán, "and reached there in p.m. with guide." I infer that his guide took him by some direct route northwesterly, not via Tapalpa as the modern highways go. [Lenz (1986, p. 312) says that Jones was in Chiquilistlán on May 13th, but other records show that he was in or

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FIG. 1 continued

Contour lines are approximated at 500, 1000, and 1500 m above sea level and up to 3000 m on the Nevado de Colima. The river, in the valley that extends northward from the ocean (where it forms the boundary between Colima and Michoacán), is known successively as the Río Coahuayana, Río Tuxpan, or (as Jones knew it) Río Cuvianes. Localities where plants were collected in April and up to mid-May, in New Mexico, Coahuila, San Luis Potosí, and extreme eastern Zacatecas, I studied less assiduously and did not map all of them.

Localities marked by dots are those from which Jones obtained a significant quantity of plant specimens (usually 25 gatherings or more). Five are in southern Zacatecas, one in San Luis Potosí, the others in Jalisco or Colima. A few less-productive localities are shown, because they are difficult to locate on published maps. Guadalajara, Jal., is shown because it could be reached by railroad and was the center whence Jones set out for the south.

Most of the localities discussed and mapped here are to be found on the *Map of Hispanic America* [at] *1: 1, 000, 000*, published by the American Geographical Society, and in the index to that map (Publ. no. 5, Vol. 2, *Geographical Names in Mexico*. U.S. Govt. Printing Office, 1944). A few additional localities are discussed in the present text.

near Zacatecas on that day.] He spent the next few days in and near Chiquilistlán, looking at mines with the cooperation of the *Gerente*, a Mr. Vasques [?Vázquez) (see McVaugh 1972, p. 250). May 30 and 31 he visited "3 or 4 of the mines of Vasques and slept at the Santa Maria. Fine scenery and deep cañons." On the 31st he returned from the Santa María mine and visited the Vasques hacienda.

On June 1 Jones interrupted his stay at Chiquilistlán in order to visit iron and mercury mines at a place he called Salcillo (or Salsillo), where he spent the night at a ranch. On the 2nd he "went over from Salsillo and saw the rest of the mercury mines and the 'Colorado' iron. Then returned to Chiquilistlán and went over near the Santoninia and saw another iron mine, on the opposite (n.) side of the river." The location of Jones's "Salsillo" is not entirely clear, as I find nothing in his notes about distance or direction from Chiquilistlán. Lenz (1986, p. 374) equated it with El Saucillo, [Jalisco], which he located in the State of Zacatecas, "about 18 miles northwest of Zacoalco [de Torres]." This is apparently the same El Saucillo that is about 10 km north of Chiquilistlán, in the same river valley (McVaugh 1972, p. 350). It may well have been Jones's locality, as McVaugh (1972) agreed. For another possible locality, see under "Saucillo" in the list of localities below.

Back in Chiquilistlán on June 3rd, Jones left rather belatedly for Santa Cruz. Lenz (1986, p. 378) says that Santa Cruz was about 12 miles south-southeast of Ameca. The settlement at that point is Santa Cruz de las Flores, but it seems doubtful that the Santa Cruz of Jones is the same. In his journal he described his trip from Chiquilistlán: "traveled all day [apparently south-westwardly], & stopped at a ranch 6 m. east. Country very rugged & breaks down to the west." He reached Santa Cruz at 10 a.m. on the 4th, "Visited 3 mines in p.m. No good. Alt. 2650° [ca. 900 m]." June 5th being Sunday, Jones spent the day quietly. "Went down to the river to bathe." The information that he gives does not seem to apply to Santa Cruz de las Flores, which is nearly north of Chiquilistlán, across the mountains in the basin of the Río de Ameca where the drainage is toward the north, at an elevation of about 1500 m. I suggest that his Santa Cruz may have been the place shown on the AGS map at 1/1, 000, 000, sheet NF 13, ca. 30 km (airline) SW of Tapalpa in the valley of one of the upper tributaries of the Río de Armería, at an elevation of less than 1000 m, where the country "is rugged and breaks down to the west" (the elevation at Santa Cruz thus agrees well enough with Jones's estimate). The matter might be settled by reference to some authoritative work on Mexican mines of the period, as Jones visited three mines there on June 4, and on June 6 he visited the Santo Domingo mine, and spent some time developing photographic "views." He also names mines that he visited at La Palma. Of the trip (June 7th) from Santa Cruz to La Palma, Jones (in his diary) said, "Left for La Palma in a.m. Reached there late in eve. The worst road of all. Ascended 3000° and down 1500°. Found many plants on the way."

On June 8th Jones "visited the San Rafael mine [evidently from his base at La Palma] and stayed there all night." The next day he "returned from the San Rafael and saw the Mexicana and stayed all night at La Palma. Botanized a good deal." On the 10th "Left La Palma early with 2 pack animals and reached Tapalpa by noon… Reached Sayula at 9 o'c at 9 p.m."

Additional bits of information may be gleaned from Jones' specimens and his notes on them. In describing *Hymenocallis jaliscensis* (Extr. from Contr. West. Bot. 18: 33. 1933), he cited "Saucillo ['Salcillo'], Jal., June 1, also at La Palma near by," and one of his specimens (no. 47) is labelled as from "Santa Cruz near La Palma."

This marked the end of his travels to the vicinity of Chiquilistlán and Tapalpa. From Sayula he took off for Zapotlán el Grande and the borderlands of Jalisco and

Colima, more or less southward along the line of the present railroad, and east of the massif of the Nevado de Colima and the associated highlands northward toward Tapalpa.

Jones left Sayula for Zapotlán on June 11, a trip of about 25 km to the southeast that occupied about 3 hours. Lenz (1986, p. 307) quoted him as saying, "Returning to Sayula I took the stage for Sapotlan which was the terminus of coach travel... Here I outfitted with burros and mules for Colima." On June 13th he set off at 10 a.m., southward toward Santa Cruz [not the Santa Cruz where he was from June 3rd to 10th]. "Went to Santa Cruz by night" (Jones diary). On the 14th, "Went to the ironworks and to Tamazula." Formerly (McVaugh 1972, p. 349) I equated this Santa Cruz of Jones with the Sta. Cruz of Mariano Bárcena (Ensayo Estadístico del Est. de Jalisco. Anal. Min. Fom. Rep. Méx. 9: 342, 349, 460. México, 1891), which was associated with the Río Covianes (the upper reaches of the Río Tuxpan). I have not located Santa Cruz on any map, but I now suspect that Jones went to Tamazula [de Gordiano] by turning east and northeast through Zapotiltic before reaching Tuxpan, and that the "ironworks" and Santa Cruz were both on the way, perhaps near Zapotiltic, and near the Río Tuxpan (which Jones called Rio Cuvianes). Lenz (1986, p. 370), under Río Cuvianes, quotes, "Río Cuvianes, June 13, nos. 641–653J." A specimen of *Chamaesyce hirta* at US (*no. 423*) bears the inscription, "Rio Cuvianes near Santa Cruz."

On June 15th Jones "Spent half a day at Tamazula and went [back down the Río Covianes or Tuxpan] to Tuzpan," then on the 16th turned south for ca. 15 km to La Higuera [also called Rancho Higuerro or Rancho Guerro, or as by Lenz (1986, p. 369) Rancho Guerrero], where he visited the Muerto mine. The next day (17th) he left "in a.m." and drove southeasterly for ca. 18 km to Pihuamo, where he arrived at 11:30 a.m. He must have visited the Purissima mine that afternoon, for on the 18th he "returned from the Purissima mine and looked at the placeres [placer mines] in p.m. Botanized, very hot. Poured down in p.m." On the 19th (Sunday, on which day Jones never worked), he spent the day "doctoring the sick político" who had a bullet wound in his hip. On the 20th he "left Pihuamo at 7 o'c and reached Tonila at 3 p.m. Good road" (it is northwest, 18–20 km, airline, so he must have averaged about 3 km per hour). He spent the next day, June 21, going some 12 km to San Marcos and returning to Tonila. "Botanized."

Thus in a week Jones worked his way down the valley of Río Tuxpan a distance of 75 km or so, botanizing as he went while making professional visits to various working mines and potential mineral sites. On June 22 he turned away from the river valley, southwesterly some 30 km to the city of Colima, then the next day by train to the Pacific coast at Manzanillo, a 4-hour trip. "Took some photos and botanized a little."

For the next three days, June 24–26, Jones's diary is uninformative. For each day there is an entry "Went over to Stadden's ranch." On two of the days it was "Stadden's ranch and the sea." On one day Jones wrote, "Got many facts." I find no reference to the name Stadden in Lenz (1986), but in the same work (p. 352) there are two bare references to Jones's visits to "the Stodden ranch" (or Stodden's ranch) on the 24th and 25th. I have no further information about Stadden/Stodden. The city of Manzanillo is built on a wide place at the western end of the coastal sandbar, south of the famous bay of the same name. To "go over" to the sea and the ranch, Jones may have gone 3 to 5 km southward, across the closed end of the coastal lagoon.

On June 27th and 28th, Jones made a quick trip inland by rail from Manzanillo to Armería. He spent the 27th at the ranch of General Maltina [?Martínez], having gone

up on a "special" [presumably laid on by the General] to the ranch of 81,000 acres. Jones was much impressed by the variety of crops produced at the ranch, but his diary says nothing about mines or mining. The next day he "returned to Manzanillo from Armeria, and then returned to Colima." There he spent the next 8 days, beginning on June 29, doing (as he said) "very little," developing photographic plates, and doing some "botanizing" (noted on June 30, July 1 and 2). He made local excursions to Jayamita to see a saltpeter mine (July 1), to an unspecified locality to see "a coal, mica and gypsum mine, only gypsum there" (July 2), to Rancho Magdalena to look at a marble mine" (July 4–5). According to Lenz (1986, p. 351), Rancho Magdalena was about 8 miles SW of the city of Colima. At about that distance from the city the 20th-century highway to Armería and Manzanillo passes through an extensive area of rugged hills that support a rich flora of calciphiles and gypsophiles. It may be that Jones visited this area on July 1 and returned on July 2nd, 4th and 5th.

It was at this time that he parted with his helper, "Dillon," as described above. On July 7th, Jones left Colima in the morning and reached Tonila, Jal., at 2 p.m. At the time of his visit the state boundaries where Colima, Jalisco, and Michoacán come together were not fully agreed upon, and some of Jones's specimens from San Marcos and Tonila were labelled as from Colima, and some from Pihuamo as from Michoacán.

The next morning (July 8th) he left at 7:30 a.m. and came to Pihuamo at 5 p.m. On the 9th he "visited the Purissima mine & took samples," and at 1 p.m. started back for Tonila, found the river too high to cross but managed to reach Tuxpan at night. On the 10th (Sunday) he "crossed the river early and reached Tonila at 9 a.m." The "ferriage" was $0.56.

He spent the night of July 10–11 in Tonila. On the 11th, according to his diary, "Tried to get outfit to start for the Volcano today but could not. Botanized. Rained hard yesterday and in the night." The cost of his hotel room was $1.87. He must finally have obtained his "outfit," for on the 12th he "Left Tonila at 4 o'c a.m. for the Volcano. Traveled till 12 o'c and then was about 1 m[ile] from base of volcano but above it. 9250° alt ± Deep barranca between. Guide & I went over to Volcano & back in 4 hours." Presumably they camped upon their return.

At the time of his visit, the volcano proper (the Volcán de Fuego) was erupting actively every two weeks (according to Jones; see Lenz, 1986, p. 92, who quotes a long paragraph from a newspaper interview that Jones gave about two weeks after his visit to the volcano). The altitudes that he mentioned appear to be on the low side. His figures were 12,000 feet (3,600 m) for the volcano proper (the Volcán de Fuego) and 13,000 feet (3,900 m) for the northern peak, the Volcán de Nieve. The accepted figures today are approximately 3,850 m and 4,340 m, respectively.

On July 13. as recorded in Jones's diary, they left after a very cold night at an elevation of perhaps 10,000 feet (estimated from his own figure of 9,250 ft). They broke camp at 7:30 a.m. and ascended to 10,500 feet [perhaps actually 11,000 or more], "at [the] pass on north side of Nevada de Colima and descended nearly to base of Mt. by 5 p.m. Rained for 2 hours. Everything wet on the ground. Camped under a madrona [sic] tree on the grass. Rain eased at 6 p.m. Not cold." Jones did not go into more detail about their route from their first camp, but it was evidently along the eastern flank of the Nevado. The airline distance was hardly more than 15 km, but the many barrancas radiating down from the peak meant that they had to travel a much longer and more difficult road if Jones wanted to collect at elevations even as much as 3000 m.

Jones and his guide left their highland camp at 7 a.m. on July 14, rode down to Zapotlán in 4 hours, paid off the extra mules he had hired in Colima, and set off at 2 p.m. "with old Juan and 4 animals for Guadalajara. Reached Sayula at 7 :30 p.m. "

After breakfast on the 15th, he "Left Sayula at 5 a.m. Rode all day to Sacoalco. Collected some. Warm in p.m. Reached Sacoalco at 4 p.m." The diary for July 16 records nothing more than some expenses for Jones himself, "& moso & boy overnight." The same day, however, he must have continued on to Guadalajara, though his diary does not confirm this until July 18, when he "Left Guadalajara at 9 a.m. & went to Irapuato and Celaya." By that time he was on his way home; on July 17th he had received a telegram telling him that "father is very sick."

## INDEX TO LOCALITIES VISITED BY JONES IN 1892 FOR GEOLOGICAL AND BOTANICAL INVESTIGATION, WITH NOTES ON LOCALITIES AND COLLECTIONS

Some of the following data are repeated from the account in the text (pages 23–33), where the emphasis is on itineraries, not on collections. Unless otherwise specified, notes on localities are based on information from Jones's specimens, from Lenz (1986), or from manuscript material at RSA.

Animas, Las, Zac.—Presumed to have been the Estancia de Animas, as on Carta Geog. Zacatecas 1/500,000 (1943) and other maps, at long. 102°, ca. 20 km WSW of El Carro, Zac., and 20 km E by N of Pastoría; visited by Jones, 28 April. See Linora and Ojo Caliente.

Armería, Col.—12 collections seen, all dated 28 June. Typical plants of coastal lowlands, including *Acrostichum*. Called by Jones "General Martina's ranch," said to include 81,000 acres. Jones spent the day of 27 June there, then returned to Manzanillo and to Colima.

Berriozabal ("Beriazillos"), Zac.—No specimens seen. Lenz (1986, p. 300) says, "On railroad 35 miles south of Zacatecas, at 6800 ft." It is ca. 10–12 km SW of Ojo Caliente [which was not on the main railroad line but at the end of track on a parallel line from Zacatecas]. Jones was there on 9 May, "botanized all day" and reached Zacatecas by train at 6 p.m.

Bota (El Bote), Zac.—A railroad station near Zacatecas, 14 May.

Carro, El, Zac.—Also known for a time as Villa Glz. Ortega. Ca. 20 km N of [La] Noria de Angeles, 25 km SW of Salinas, S. L. P., and according to Jones, "8 miles E of Pastorilla." See the text above for his travels on May 5 and 6 from Ramos to El Carro, to San Miguel and a nearby brackish lake, and his eventual return to Pastorilla.

Casualidad, Zac.—9 collections seen, dated 26 or 28 April. Plants of arid shrubland (*matorral*). On the 26th Jones set out for Casualidad, about 30 km E of Zacatecas near the border between the States of Zacatecas and San Luis Potosí. A railroad line to Casualidad had been proposed but not built, so Jones travelled in a mule-drawn wagon. He arrived in the evening of April 26. He said "It was a region of rolling hills and no vegetation but yuccas and cactus and thorny Leguminosae." He reported visiting the mines on the 27th, and in the afternoon "Visited the lead mines (3) of the Potosi Mts. Collected some plants."

Chiquilistlán, Jal.—About 50 collections seen, dated 28 May to 2 June, except nos. 207 (*Mimosa*), 355 (*Stemmadenia*), and 470 (*Karwinskia*), dated respectively 13, 15, and 19 May, at which times Jones was in or near Zacatecas. Plants of oak forest, dry deciduous forest or *matorral*. During his stay at Chiquilistlán Jones visited the nearby Vasques (?Vázquez) mines ("3 or 4 of them"), slept at the Santa María on 30 May and returned to Chiquilistlán and visited the Vasques hacienda on the 31st. Left for Saucillo on 1 June, returned the next day and "went over to the Santoninia mines and also another iron mine on the other side of the river." Left for Santa Cruz early on 3 June.

Coahuayana, Río, Col./Mich.—The river, in the valley that extends northward from the ocean (where it forms the boundary between Colima and Michoacán), is known successively as the Río Coahuayana, Río Tuxpan or (as Jones knew it above Tuxpan, Jal.), Río Cuvianes. See Fig. 1.

Colima, Col.—About 40 collections seen, dated 30 June to 5 July. Jones worked in and near Colima from 29 June to 6 July, and passed through earlier on his way to Manzanillo and Armería. Plants of relatively humid forests of coastal foothills, including various calciphiles. From a base in Colima Jones "botanized a little" on 30 June; on July 1 he went to see a saltpeter mine (and botanized) at Jayamita, q.v.; on the 2nd he went to see a "coal, mica, and gypsum mine, only gypsum there" (he botanized); on the 4th he went to see "marble at Rancho Magdalena" and on the 5th he returned to Colima.

Corkhills mine, see Ojo Caliente.

Covison (mine), S. L. P.—One collection, identified as *Ferocactus latispinus* by G. Lindsay (POM 83294), includes a long, typed description. On 29 April Jones was escorted to the "Covison mine" at or near La Paz, after which he returned to Ojo Caliente, Zac. Apparently Covison was never mentioned by Jones as a settlement, but only as this mine in the vicinity of La Paz.

Cuvianes (*Cavianes*, *Covianes*, *Cuvianus*), Río), Jal.—About 25 collections seen, all dated 13 June. Jones travelled on 13 June from Zapotlán toward Tamazula, reaching Santa Cruz #2 at night, presumably having gone at least a part of the way up the river. Plants include many lowland ruderal weeds. See Coahuayana, Río.

Escalón, Chih.—Jones changed trains here. He continued toward Sierra Mojada, Coah., by a branch railroad from Escalón in the southeastern corner of Chihuahua. He left Escalón at 6 a.m. on 18 April, and reached the mines at Sierra Mojada at 10 a.m. He found it very dry there. He walked two miles up to the upper town, "botanized all day" and part of the next, and returned to the junction at Escalón on the 20th, presumably having completed his survey of the mines on the 19th.

Ferrería, (de Tula), Jal.—About 25 collections seen, dated 28 May (one 27 May). Plants are those of moderately dry montane forests. It appears that on 27 May Jones passed through Tapalpa on the way to Ferrería, which he reached

in the afternoon. He went to the nearby rancho of Ferrería [de Tula] [some 12–15 km northeast of Tapalpa] "in p.m. Saw the good iron works at Ferrería. Slept there. The manager was very kind." The next day (28th) he found a guide to take him to Chiquilistlán.

Guadalajara, Jal.—Jones arrived by rail from Irapuato, Gto., 23 May at 4:45 p.m., and continued (presumably by rail) to Sayula on the 25th. There he stayed for two days, assembling what he needed for an overland pack trip beyond the railroad, "over the Tapalpa Mountains to Chiquilistlán."

Guerro (or Guerrero or Querro), Rancho, Jal. 15 June. See La Higuera.

Higuera, La, Jal.—Five collections seen, all dated 15 June. From Jones's account it appears that he did not reach La Higuera until 16 June, arriving from Tuxpan. See Muerto (mine). The next day (17th) he drove to Pihuamo. Plants are typical shrubs of foothill deciduous forest.

Irapuato, Gto.—Jones passed through this city both coming and going, from Zacatecas toward Guadalajara, Jal., 22 May, and northward toward home on 18 July.

"Iron works" (or mines), not otherwise named, see Chiquilistlán, Ferrería, Santa Cruz #2, and Tamazula.

Jayamita, Col.—Four collections seen, all dated 1 July. A duplicate sheet of no. 83, "Euonymus" (*Acalypha coryloides*) 1 Jul POM 84508, is labelled "Jayamita, Jalisco." Plants are shrubs from the relatively humid deciduous forests of the coastal foothills. Jayamita is not mapped in Fig. 1, as I have not been able to find it on any other map. Jones was in Colima City early in July He made local excursions, to Jayamita to see a saltpeter mine (1 July), to an unspecified locality to see "a coal, mica and gypsum mine, only gypsum there" (2 July ), to Rancho Magdalena to look at a marble mine" (4–5 July). It seems likely that all these excursions were toward the rocky calcareous areas to the southwest of Colima.

Linora, (Zac., according to Lenz, 1986, p. 349).—Also for a time called Villa Obregón, as on Carta Geog. Zacatecas 1/500,000, 1943; Jones, on 1 May, "Rode from Ojo Caliente 15 m. to Pastorilla [Pastoría] by noon where we found much lead… p.m. rode to Linora 15 m." He visited at Linora and stayed over night, 2–3 May [he collected] no. 228, no. 568; on 3 May he rode [from Linora] to Ramos, S. L. P. [the settlement and the mine of the same name], 18 mi from Pastorilla. Jones's "Linora" seems to have been [La] Noria de Angeles, ca. 30 km SW of Salinas, S. L. P., and 20 km S of El Carro, Zac.

Magdalena, Rancho, Col.—On the 4th of July Jones went from Colima to see "some marble at Rancho Magdalena" and on the 5th he returned "from seeing marble mine," apparently having been forced to stay over by a very hard rainstorm.

Maltina (?Martínez), General, ranch, see Armería.

Manzanillo ("Manzanilla"), Col.—About 25 collections seen, dated 25 June (one on 26 June). Note on 23 June, "Botanized a little." Plants are those typical of the coastal hills, and maritime rocks, sands, and lagoons. On 24, 25, and 26 June the entries read "Went over to Stadden's ranch and to the sea," evidently from a base in Manzanillo across the dilated end of the coastal sandbar on which the city stands.

Mexicana, mine, see Palma, La.

Mexico City (México), D.F.—Jones reached Mexico City by train on 19 May, en route from Zacatecas to Irapuato, Gto., and Guadalajara. Jal. Lenz (1986, p. 353) quotes him as saying that he collected plants "along the lakes below Mexico City," but I find no record of any such plants. Jones left for Irapuato on 21 or 22 May.

Milagros ("Milleagres," "Milleagros"), Los, Zac.—Two collections of cacti seen, a few others probably collected, date of 4 May. Jones was making a side trip from Zacatecas City and Ojo Caliente to a series of ore prospects in arid eastern Zacatecas and adjacent San Luis Potosí. He recorded that he went (about 20 km SE) from Ojo Caliente to Pastoría ("Pastorilla"), presumably on the first of May. Milagros is about 12 km W of Pastoría, thus not on a direct line from Ojo Caliente, but his route may have taken him that way. On the 4th of May, Jones was traveling from Ramos, S. L. P., to Salinas, S. L P., so perhaps his plants from Milagros were collected before that.

Mojada, Mojada Mts., see Sierra Mojada.

Muerto, (mine), Jal., visited from La Higuera, q.v., on 16 June.

Noria de Angeles, La, Zac.—Thought to have been the place called "Linora" by Jones. See under Ojo Caliente.

Ojo Caliente, Zac.—About 30 collections seen, mostly dated 9 May, most of the plants typical of arid shrubland. "*Acacia constricta*" (=?*Mimosa*), no. 587. is dated 30 April (POM 28438).

According to Lenz (p. 347, under La Paz), on Apr 28th Jones was at the "Cork-hills mine" and "later all the folks went with us to Las Animas and left us. Then drove to Covison." On the 29th (Jones diary), "Mr. Foreman took me over to La Paz and young Portus [?Portis] showed me through the Covison mine. p.m. drove to Ojo Caliente by 3 p.m." He was in Ojo Caliente, Apr. 29, 30, [presumably on May 1, he], "Rode from Ojo Caliente 15 m. to Pastorilla by noon where we found much lead… p.m. rode to Linora 15 m." May 2 [he collected] no. 228, no. 568; May 3, rode [from Linora, which see] to Ramos, S. L. P. [the settlement and the mine of the same name], 18 mi from Pastorilla; May 4 rode to Salinas, S. L. P. (SE of Ramos), collected nos. 572–574; he was in Ramos May 5, left Ramos at 7 a.m. on May 6, rode to El Carro, (Zac.), visited the San Miguel quicksilver deposits at San Miguel and at a "lake near San Miguel" collected at least nos. 157 and 585–592, May 6–7; on May 7 left for Pastorilla ca. "8 mi W of El Carro," and on May 9 he was back in Ojo Caliente to collect nos. 151 and no. 158. It would be interesting to know how much time he spent in prospecting for minerals, aside from lead on May 1 and quicksilver on May 6.

Palma, La, Jal.—About 65 collections seen, all dated 7, 8, or 9 June. Plants indicate a semi-humid tropical deciduous forest with many ferns, orchids, *Piper*, *Ficus*, *Jarilla, Dorstenia*, *Pinguicula*, and also some elements from more temperate floral zones, as *Coriaria*, *Ranunculus*, *Valeriana*, *Polianthes*. From La Palma Jones visited the San Rafael mine and stayed all night there. On 9 June he returned from the San Rafael, saw the Mexicana mine and stayed the night at La Palma. "Botanized a good deal." On June 10th he went on to Tapalpa by noon.

Pastoría ("Pastorilla"), Zac.—Seven collections seen, dated 2 May (No. 316, 7 May, *Asclepias longicornu* POM 75835). Jones was in Pastoría more than once between 1 May and 8 May, also visiting Linora, Ramos, Salinas, and San Miguel. See these in the text above and see also Ojo Caliente, Zac.

Paz, La, S. L. P.—Said by Lenz (1986, p. 347) to be SE of Zacatecas City. On 29 April (Jones diary), "Mr. Foreman took me over to La Paz and young Portus [?Portis] showed me through the Covison mine. p.m. drove to Ojo Caliente by 3 p.m." This is assumed to have been the place called San Antonio de la Paz, shown on the Mapa de México at 1/250, 000 and on some modern highway maps, e.g., *Est. Zacatecas 1/800,000* (Guía Roji, undated), where it is located just S of Hwy. 49, ca. 20 km S of Ramos, 12 km W of Salinas, and 25 km NE of [Las] Animas, Zac. See Ojo Caliente.

Pihuamo, Jal. ("Michoacan" of some of Jones's labels).—About 25 collections seen, four dated 20 June, the others 16 June. Jones is said to have arrived at Pihuamo from La Higuera on 17 June, 11:30 a.m. He must have visited the Purissima mine that afternoon, for on the 18th he "returned from the Purissima mine and looked at the placeres" [placer mines] in p.m. Botanized, very hot. Poured down in p.m." On the 19th (Sunday, on which day Jones never worked), he spent the day "doctoring the sick político" who had a bullet wound in his hip. On the 20th he "left Pihuamo at 7 o'c and reached Tonila at 3 p.m." If his collections are correctly dated, it seems they must have been taken between La Higuera and Pihuamo on the 16th and between Pihuamo and Tonila on the 20th. On 8 July he returned to Pihuamo from Tonila, on the 9th he revisited the Purissima mine and "took samples."

*Placeres* (placer mines), see Pihuamo.

Potosi Mts., Zac.—No specimens seen, though Jones reported in his diary for 27 April, "Visited the lead mines (3) of the Potosi Mts. Collected some plants)." See Casualidad, Zac. Cerro Potosí is the high point in an isolated range; it is about 50 km E of Zacatecas and 20 km NE of Ojo Caliente, nearly on the line between Zacatecas and San Luis Potosí.

Purissima (mine), see Pihuamo.

Ramos, S. L. P.—Four specimens (and four duplicates) seen, dated 3–5 May. Jones took a side-trip of about two weeks, beginning from Ojo Caliente (ca. 40 km SE of Zacatecas), camping in the arid high plains farther to the east. He wrote that Ojo Caliente, Pastorilla, Linora, and Ramos are all in the same region of rolling hills with no vegetation but yuccas and cactus and thorny Leguminosae. See also Salinas.

Rincón, Doña Ana Co., N. Mex.—Jones stopped here on April 15, en route to Mexico on the railroad, at least long enough to collect one specimen (Zoe 3: 291. Jan 1893).

Sacoalco, see Zacoalco.

Salcillo, see Saucillo.

Salinas, S. L. P.—Three specimens seen, all dated 4 May, one (no. 573, *Opuntia* sp., POM 83285) with additional note "Camp Silvio"). According to Lenz (1986, p. 374) nos. 572–574 were collected at Salinas. The locality (elev. ca. 2100 m) is ca. 30 km SE of Ramos, q.v., and 25 km NE of El Carro, Zac. Jones rode from Ramos to Salinas on 4 May and returned the same day or the next.

San Marcos, Jal. ("Colima").—About 20 collections seen, all dated 21 June. About two-thirds of them are ferns or fern-allies. Lenz (1986, p. 377) says that Jones spent the day of June 21st going from Tonila to San Marcos and returning, to which Jones's diary added "Botanized." San Marcos lies in the foothills, at ca. 1000 m elevation, near the beginning of the steeper ascent into the high volcanoes. In early July when Jones started northward along the flank of the volcanoes, he began from Tonila but climbed somewhat to the west of San Marcos.

San Miguel, Zac.—Apparently very close to El Carro, q.v. Twelve collections seen (incl. 2 duplicates), dated 6 May except one dated 16 May. Seven are labelled "Lake" or "Borders of a lake" near San Miguel, one copied label reads "Lake Ness San Miguel" and one "near San Miguel. Margin of brackish lake." Plants are those of dry highland grassslands, incl. one (*Marsilea*) typical of depressions in grassland. Jones left Ramos, S. L. P., at 7 a.m. on May 6, rode to El Carro, Zac., visited the San Miguel quicksilver deposits at San Miguel and at a "lake near San Miguel" collected at least nos. 157 and 585–592.

San Rafael, mine, see Palma, La.

Santa Cruz, Jal. (ca. 25 km a little S of W of Tapalpa).—About 45 collections seen, dated 3–7 June except for three collections dated 14 June, q.v. under Santa Cruz #2. Jones left Chiquilistlán on 3 June, reached Santa Cruz at 10 a.m. on the 4th. See also Santo Domingo (mine), visited 6 June. Plants collected at Santa Cruz are those of somewhat humid upland deciduous forest. On 7 June Jones (in his diary) said of his trip from Santa Cruz to La Palma, "Left for La Palma in a.m. Reached there late in eve. The worst road of all. Ascended 3000° and down 1500°. Found many plants on the way."

Santa Cruz No. 2, Jal., on the Río Tuxpan ("Cuvianes") below Tamazula.—On June 13th Jones set off from Sayula at 10 a.m., southward toward Santa Cruz [not the Santa Cruz where he was from June 3rd to 10th]. "Went to Santa Cruz by night" [Jones diary]. On the 14th, "Went to the ironworks and to Tamazula." About six collections seen, dated 14 June; one labelled "Santa Cruz near Tapalpa" and one "Santa Cruz No. 2, near La Palma."

Santa María, mine, see Chiquilistlán.

Santa Rosalía, [Zac.]—"*Nama hispidum*" (*spathulatum*); only the one specimen seen, the locality presumably near Zacatecas, Zac., where Jones was based during early May. No. 614, 15 May (POM 73490).

Santo Domingo, mine, visited 6 June; see Santa Cruz.

Santoninia, mine, see Chiquilistlán.

Sapotlán, see Zapotlán.

Saucillo, Jal. ("Salcillo" or "Salsillo").—About 22 collections seen, dated 1 June (one dated 2 June). The plants are mostly those of the semi-arid upland tropical deciduous forest. The late Howard Gentry (an agave specialist) and I went to Chiquilistlán on 30–31 Jan 1975, in search of an agave that Jones had collected at "Salsillo." We inquired in town (83 years after Jones's visit) and were promptly given precise directions to El Saucillo, a long-unused mercury mine about 5 km south and some 2 km west of Chiquilistlán. The locality shown on the map (Fig. 1, no. 7) is another Saucillo, the one accepted by Lenz (1986, p. 374) and by McVaugh (1972, p. 350) as that visited by Jones.

Sayula, Jal.—Five specimens seen, dated 26 or 27 May, except one dated 10 June. Jones came from Guadalajara (presumably by rail) to Sayula on the 25th. He was in Sayula from 25–27 May, assembling an outfit for overland travel to Tapalpa and Chiquilistlán. He stopped briefly in Sayula again, on his way south, 10–11 June, left Sayula for Zapotlán on June 11, a trip of about 25 km to the southeast that occupied about 3 hours. Lenz (1986p. 307) quoted him as saying, "Returning to Sayula I took the stage for Sapotlan which was the terminus of coach travel. Here I outfitted with burros and mules for Colima."

Sierra Mojada Mts., Coah. (often "Sierra Mojada" or "Mojada" only).—About 75 specimens seen, all dated 19 or 20 April except no. 348, "*Giliastrum*," "flowers open at 9 o'c, a.m. and close at about 4 o'c. p.m. Sierra Mojada, Mexico, April 18, 1892," and no. 623, "*Greggia*" "Mojada, Mex. 21 April" (POM 95929). Apparently a rich spring flora in a brush-covered desert mountain range with some small trees. Jones seems to have spent most of his time botanizing, having arrrived on 18 April and left on the 20th. See Escalón.

Stadden's ranch, Col., see Manzanillo.

Tamazula (de Gordiano), Jal. —No plant collections seen. Jones reached Santa Cruz No. 2 "by night," 13 June, from Zapotlán. He recorded later, "14 Tues. Went to the iron works and to Tamazula. 15 Wed. Spent half a day at Tamazula and went to Tuzpan."

Tapalpa, Jal.—About 25 collections seen, mostly dated either 27 May or 10 June. Jones hired a muleteer and four mules and set out from Sayula for Tapalpa at 6 a.m. on 27 May. Sayula lies at the level of a series of shallow and seasonally dry

lake-beds, and the improved road to the forested mountains around Tapalpa is still very steep and tortuous a century later. Evidently Jones reached Tapalpa by midday. Specimens dated 27 May are presumably from those mountains. The supposed date of No. 133, "*Ximenia parviflora*, was 31 May, perhaps an error for 27 May, as the specimen at MSC is labelled "Tapalpa Mts. 8000 ft among pines." Jones went "in p.m." of the 27th to the nearby rancho of Ferrería [de Tula] [some 12–15 km northeast of Tapalpa] "Saw the good iron works at Ferrería. Slept there." On 10 June Jones left La Palma, reached Tapalpa by noon and Sayula at 9 p.m. On 11 June he left Sayula for Zapotlán. That route does not ascend into the "Tapalpa Mts." so perhaps the date of 11 June on no. 308 ("*Arctostaphylos*") is erroneous.

Tonila, Jal. ("Colima").—About 15 collections seen, dated 8 July except no. 281 (1 July) and a specimen unnumbered (11 July, POM 29489). On the 11th the diary says, "Botanized." Ten of the collections were ferns of the humid foothill woodlands. On 1 July Jones was in or near Colima; he spent the nights of 7–8 July and 10–11 July in Tonila.

Tuxpan ("Tuzpan"), Jal.—About 12 collections seen, all dated 15 June. Plants of the humid woodlands of the foothills. On June 15th Jones "Spent half a day at Tamazula and went [back down the Río Covianes or Tuxpan] to Tuxpan," then on the 16th turned south for ca. 15 km to "Rancho Higuerro" [La Higuera], where he visited the Muerto mine. On 12 July, making for the eastern slopes of the active volcano from Tonila, he must have climbed more nearly north, thus to the west of Tuxpan.

Vasques (?Vázquez) mines, and Hacienda. See Chiquilistlán.

Volcano of Colima, Jal. ("Volcan, Mex."; "Volcan").—About 85 collections seen, all dated either 13 July or 14 July. This was the most interesting botanizing that Jones did during this summer. He was the first to make a significant collection there (C. G. Pringle, the renowned collector of Mexican plants, spent several days on the volcanoes in May, 1893). Jones spent the night of July 10–11 in Tonila. On the 11th, according to his diary, "Tried to get outfit to start for the Volcano today but could not. Botanized. Rained hard yesterday and in the night." On the 12th he "Left Tonila at 4 o'c a.m. for the Volcano. Traveled till 12 o'c and then was about 1 m[ile] from base of volcano but above it. 9250° alt ± Deep barranca between. Guide & I went over to Volcano & back in 4 hours" (and camped upon their return). Jones seems never to have distinguished between the active volcano (the "Volcán de Fuego") and the much higher peak to the north (the "Volcán de Nieve"), from the side of which the other seems to arise.

On July 13 the diary records, they left after a very cold night at an elevation of perhaps 10,000 feet [an editorial estimate based on Jones's own figure of 9,250]. They broke camp at 7:30 a.m. and ascended to 10, 500 feet [perhaps actually 11,000 or more)] "at [the] pass on north side of Nevada [sic] de Colima and descended nearly to base of Mt. [toward Zapotlán] by 5 p.m. Rained for 2 hours. Everything wet on the ground. Camped under a madrona [sic] tree on the grass. Rain eased at 6 p.m. Not cold." Jones did not go into more detail about their route from their first camp, but it was evidently along the eastern flank of the Nevado, an airline distance hardly more

than 15 km, the traveling difficult because of the many *barrancas* radiating down from the peak. Clearly Jones did not seek an easy way. His notations on specimens include such comments as "middle elevations," "alpine," or "10,000 ft.," and there are many plants from the high bunchgrass asssociation with alders, and the sparsely populated slopes above and near timberline.

Zacatecas, Zac. —About 13 collections seen, 5 dated 23 April (soon after Jones's arrival from the north by railroad), one dated 4 May, two dated 16 May, and 8 dated 23 June. On the latter date Jones was on his way from Colima to Manzanillo; the plants so dated are in general those of the dry interior uplands (e.g., *Adolphia infesta, Reseda luteola*) and perhaps mistakenly dated 23 June instead of 23 April. Jones worked out of Zacatecas for about a month after 23 April, with a short trip to Casualidad and Cerro Potosí, and a longer excursion to Ramos, S. L. P., q.v. and El Carro, Zac., q.v.

Zacoalco (de Torres) ("Sacoalco"), Jal.—Three specimens seen, dated 16 July. Lenz (1986, p. 307) quoted the diary as of "15 June," "Left Sayula at 5 a.m. Rode all day to Sacoalco. Collected some… Reached Sacoalco at 4 p.m. "

Zapotlán el Rey ("Sapotlan"), Jal.—No specimens seen among those recovered. Jones stopped here over the weekend of 11–13 June, "bargained for an outfit for Colima. Wrote about 12 letters." He continued to Santa Cruz, q.v., on the 13th. He returned a month later, after collecting on the volcanoes, and spent three hours in Zapotlán on 14 July before leaving for Sayula and Guadalajara.

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# APPENDIX

## List of Jones's numbered plant collections, 1892, as far as these are known to me, arranged by locality and by number under each locality

POM = Herbarium of Pomona College, now a part of RSA (Herbarium of Rancho Santa Ana Botanic Garden); MSC = Herbarium of Michigan State University; NY = Herbarium of New York Botanical Garden; US = U.S. National Herbarium (Smithsonian Institution). The serial numbers on the specimens at POM were not routinely recorded before 2003. Labels are hand-written or typed; the writer is named if known to me. Jones's own rather distinctive script appears on relatively few labels. Determinations and quoted passages are taken directly from the labels unless otherwise stated. Botanical names on the labels seem to vary from mere guesses to the results of careful study, but most of them are unverified.

### Armería, Colima

s.n. *Cyperus ochraceus* [det. O'Neill], 28 June, POM 117761
60. *Cissus verticillata*, 28 June
71. *Karwinskia humboldtiana*, 28 June, POM 850111
156. *Cassia atomaria* (*Senna emar.*), 28 June
173. *Cassia emarginata* (*Senna*), 28 June
229. *Samolus valerandi*, 28 June, POM 75862
337. *Astianthus viminalis*, 28 June
337a. *Chilopsis linearis*
474. *Dichromena colorata*, 28 June
475. *Fimbristylis spadicea*, 28 June, POM
502. *Acrostichum*, 28 June; "fronds pinnate 6 feet high"
664. *Cyperus odoratus*, 28 June, POM

### Casualidad, Zacatecas

s.n. *Dalea argyraea*, 26 Apr, POM 28927
s.n. *Iresine*, 26 Apr, POM 102564
16. "*Petalonyx*" [*Mortonia palmeri* or sp] ["low heath like scrub on rocky places"], 26 Apr, POM-2 sheets, US, fide J. Henrickson
120. "*Rhus*" [spiny shrub], 26 Apr, POM 86044
146. *Phaca zacatecana*, 26 Apr, NY, holotype
196. *Mimosa biuncifera* [typed: "Low and rigidly branched shrub"], 29 Apr, POM 26684, POM 28440
248. *Cylindropuntia* [typed: "6 inches high in tufts among the rocks. Looks like white balls at a distance 7000 feet alt"], 28 Apr, POM 83297

CASUALIDAD, ZACATECAS (cont.)
398. *Lobelia laxiflora* var. *angustifolia*, 26 Apr, POM 67869
541. *Notholaena ferruginea*, 28 Apr

CHIQUILISTLÁN, JAL.
s.n. *Vernonia viarum* ["type" scrips. Jones], 30 May, POM A1774 (?); det. *V. deppeana* by B. L. Rob. & Blake
s.n. *Quercus polymorpha*, 28 May, POM 106185
s.n. *Psidium guajava* ["Lead Mine"], 28 May, POM 117688
s.n. *Calliandra*, 28 May, POM 28244
s.n. *Lysiloma acapulcense*, 28 May, POM 28622
s.n. *Comarostaphylis glaucescens*, 28 May, POM 77302
s.n. *Crotalaria*, 28 May, POM 29583
s.n. *Albizia lebbek* ["lead mine, near C"], 30 May, POM 28586
s.n. *Acacia farnesiana*, 31 May, POM 29478
s.n. *Acacia*, 28 May, POM 28436
s.n. *Agave*, 1 June, POM 109141
s.n. *Polypodium thysanolepis*, 28 May, POM 120081
s.n. *Baccharis* (*Archib*...?), 28 May, POM 37322
s.n. *Asclepias jaliscana*, 28 May
36. *Loranthus calyculatus* [typed: "Tree 60 feet high, called Tacamo, 2 feet diameter"], 2 June, POM 105967
39. *Bursera* ["at lead mine"], 30 May, POM 86495
40. *Pistacia mexicana* ["medium sized shrub"], 30 May, POM 86498
64. *Annona* [?84; label illegible], POM 70301
70. *Karwinskia rzedowskii*, 19 May, POM 86213; presumed duplicate, POM 85400
74. "?*Erythroxylon*," 28 May, POM 86507
78. ??, 2 June, MSC
80. *Guazuma ulmifolia*
180. *Erythrina leptorhiza* [det. Krukoff 1969], 28 May, POM 29007
181. *Lysiloma acapulcense*, 28 May; scrips. Jones exc. name, POM 29008; same, typed label, POM 28444
187. *Pithecellobium tomentosum* ["at lead mine"], 30 May, POM 28215; scrips Jones exc. name, POM 29012
207. *Mimosa albida*, 13 May, POM 28585, POM 26592
208. *Acacia pennatula*, 28 May; scrips. Jones, POM 27060
288. *Vernonia viarum* ["type"], 30 May]
301. *Vaccinium stenophyllum*, 28 May, POM 77175
302. *Comostaphyllis glaucescens* [scrips. Jones], 28 May, POM 77454
303. *Arctostaphylos pungens*, 28 May, POM 77300
317. *Asclepias mexicana*, 28 May; scrips. Jones, POM 75501; also *A. jaliscana*, scrips. Munz, POM 76070
335. *Stemmadenia tomentosa*, 15 May; typed, POM 76969; scrips. Jones, POM 75444
350. *Plumeria*, 30 May, POM 76811, POM 75443
378. *Dyschoriste mcvaughii* ["type" (paratype)], 28 May, POM 69546
386. *Hyptis albida*, 30 May, POM 70124
420. *Euphorbia radians*, [*E. strigosa* ex V. W. Steinmann] 28 May, POM 85475
436. *Quercus* [stam. fls.], 28 May, POM 106180
440. *Quercus crenatifolia* [*Q. polymorpha* ex C. H. Muller], 28 May, POM 106179
441. *Quercus magnoliaefolia*, 28 May, POM 106209
442. *Quercus magnoliaefolia* ["Lead mine"], 30 May, POM 106182

CHIQUILISTLÁN, JAL. (cont.)
443. *Quercus*
444. *Quercus magnoliaefolia*, 28 May, POM 106208
445. *Quercus serrulata* [type], 28 May, POM 106181
446. *Quercus jonesii* [type; long typed description], 28 May, POM 106272
447. *Yucca valida* Brandg. [*Y.* cf *schottii*], 1 June, POM 109484
449. *Agave* ?*pedunculifera*, 31 May
489. *Pinus*, 28 May
492. *Pinus* (?*lumholtzii*), 28 May
502. *Acrostichum aureum*, 31 May
508. *Polypodium* [long entire lves], 28 May
517. *Gymnogramme*, 28 May
709. *Tillandsia fasciculata* [det. L. B. Smith], 30 May
710. *Cereus*, 30 May, POM 83283
712. (?Verbenac.), 28 May

COLIMA, COLIMA
s.n. *Ludwigia octovalvis*, 30 June, POM 46276
s.n. "*Euonymus*" (*Acalypha coryloides*), 2 July, POM 84506
11. *Mascagnia macroptera*, 2 July; ["Cherry-like shrub, open branched, branches small and long"] POM 84245; ["*Malpighia*"] MSC
23. *Phyllanthus mocinianus*, 5 July
23. *Phyllanthus* [typed: "Delicate and very graceful shrub or small tree 10–12 feet high, grows on (3 words illegible) Valleys"], 5 July, POM 85602
23. *Phyllanthus orbiculatus* Muell. [typed, except binomial], 5 July, POM 86554 (same sp. as POM 85602, larger specimen); "Delicate and very graceful shrub or small tree 10–12 feet high, grows on rocky debris in valleys"
24. *Sapranthus violaceus* [det. Schatz], 2 July, POM 117207
72. *Samyda mexicana*, 2 July
73. "*Bursera reflexa* Rose & Jones" ["type" of *B. jonesii*], 2 July, POM 86504
79. "*Celtis*" (*Croton*), 2 July, POM 106097
84. "*Celtis*" (*Croton*), 5 July, POM 106095; [typed:] "Weak shrub, 10–20 feet high, branches slender"
103. *Podopterus cordifolius*, 25 June
118. *Oxalis latifolia*, 2 July
118. *Oxalis* ["deeply cut halves of lfts"], 2 July, POM 86753
127. *Manihot michaelis* [label typed], 2 July, POM 85423; "Elder-like shrub or small tree"
154. *Phyllanhus mocinianus*, 2 July
154. *Phyllanthus* [2 sheets; "same as 23"], 2 July, POM 86557, POM 85604
166. *Tamarindus indica*, 30 June, MSC; POM 29680; "same as 165?"
168. *Caesalpinia coriaria*, 2 July, MSC; POM 28651 [see same description under Jayamita]
174. *Caesalpinia platyloba*, 2 July, MSC
174. *Caesalpinia* [scrips. Jones], [typed] 2 July, POM 28332; "Small tree with open branches. Flowers smell like carrion"
175. *Cassia emarginata* "*Senna*," 2 July
177. *Diphysa* [typed], 2 July, POM 28996; "Small tree like the locust"
177. *Oenothera rosea* [scrips. Jones exc. name], 2 July, POM 37766
178. *Cassia pringlei* ("*Senna wiz.*") [typed], 2 July, POM 27296; "Very slender vine-like shrub with pendent branches, 4–30 feet high"

COLIMA, COLIMA (cont.)
185. *Pithecellobium tortum*, 5 July, POM 29013; scrips. Jones exc. name
185. "*Calliandra*"("*Zapoteca*"), 5 July, POM 28218; typed: "Very graceful small tree"
186. ?*Calliandra tetraphylla*, 2 July, POM 28219
196. *Calliandra* [scrips. ?P. A. Munz], 2 July, POM 26683
327. *Tournefortia* [scrips. Jones], 2 July, POM 71465
327. same *Tournefortia* [scrips. ?Munz], 2 July, POM 72282; "open and almost pendent branched shrub with short branches"
351. *Plumeria*, 2 July, POM 76813
375. *Malachra capitata*, 30 June, POM 83706G
467. *Tradescantia orchidophylla*, 5 July; "below Colima"
471. *Commelina erecta*, 30 June
668. *Passiflora colimensis* , 30 June, POM 84401
672. *Lonchocarpus lanceolatus* [det. Mario Sousa], 2 July, POM 28990
674. *Rhus* (?*Bursera*), 2 July

COVISON (MINE), SAN LUIS POTOSÍ
246. *Ferocactus latispinus* [det. G. Lindsay], 30 Apr, POM 83294 (long typed description); Covison was the name of a mine in the vicinity of La Paz, q.v.; see also Ojo Caliente]

CUVIANES, JALISCO (Cavianes, Covianes, Cuvianus), RÍO
s.n. *Mecardonia vandellioides*, 13 June, POM 4598
s.n. *Oenothera kunthiana*, 13 June, POM 38611
s.n. *Dysodia*, 13 June, POM 67158
s.n. *Chamaesyce hyssopifolia*, 13 June, POM 85515
s.n. *Heliotropium indicum*, 13 June, POM 72279
s.n. (or 357). *Echinochloa*, 13 June, POM 116121
142. [legume; label typed], 13 June, POM 26796; "Flowers yellow and beak very long"
155. *Cassia occidentalis* (*Senna*) [scrips. Jones exc. name], 13 June, POM 26674; scrips. ?Munz, POM 28643; typed label, POM 28642,
170. *Cassia tora* (*Senna obtus.*), 13 June, POM 26680 (older specimen POM 29585)
200. *Rhynchosia* [all typed], 13 June, POM 29290
209. *Cologania* [narrow lvd], 13 June
210. *Rhynchospora minima*, 13 June; see 200
272. "*Dysodia*," 13 June, POM 67154
315. *Asclepias curassavica*, 13 June, POM 76033
329. *Heliotropium*, 13 June, POM 72278
423. *Chamaesyce hirta*, US; "Rio Cuvianes near SantaCruz"
423. *Euphorbia pilulifera* [scrips. Jones], 13 June, POM 85603
423. *Chamaesyce hirta* [det. Burch], 13 June, POM 86211
443. *Bidens odorata* ["Rio Cuvianes Tuxpan," scrips. Jones], 13 June
546. *Apium leptophyllum*, 13 June
641. *Conyza sophiaefolia* [det. S. F. Blake], 13 June
645. *Asclepias glaucescens*, 13 June
646. *Merremia quinquefolia*, 13 June, POM 71010
648. *Cuphea* ["Rio Cuvianus"], 13 June, POM 70320
652. *Eragrostis mex.* (*tephrosanthes*), 13 June

FERRERÍA, [DE TULA], JALISCO
s.n. *Mecardonia vandelloides*, 28 May, POM 45099
s.n. *Oxalis drummondii*, 28 May, POM 86765
s.n. *Arracia tapalpae* ["F. de Tula"], 28 May; "Tapalpa Mountain"
s.n. *Symphoricarpos microphyllus*, 28 May, POM 67589
s.n. *Arbutus* (hairy), 28 May, POM 77221
69. *Rhamnus mucronata*
112. *Phacelia madrense*, 28 May, POM 73727
200. *Comarostaphyllis discolor*, 27 May, POM 77174
230. *Cornus excelsa* [scrips Jones], 28 May, POM 77743; typed labels, POM 77933, POM 77934
238. *Arracacia tapalpae* Jones ["type," scrips. Jones], 28 May, POM 82990
303. *Arctostaphylos pungens*, 28 May, POM 77247
401. *Cuphea llavea*
401. *Azolla*, 28 May, POM 119141
409. *Polygonum punctatum*, 28 May, POM 103387
437. *Salix jaliscana* type-no. (=*S. laevigata* Bebb ex C. R. Ball & Argus)], 28 May, POM 107135
439a. ?*Alnus pringlei*, 28 May
455. ?*Zephyranthes fosteri*, 28 May, US
468a. *Smilax*, 28 May
481. *Aegopogon tenellus*
497a. *Adiantum thalictroides*, 28 May, POM
540. *Bommeria pedata*, 28 May, POM
704. *Arbutus* (hairy), 28 May, POM 77166
706. *Ranunculus petiolaris*, 28 May, POM 100542

GUERRO (or QUERRO), "Colima," 15 June; see Higuera, Jal.

HIGUERA, [LA], JALISCO.—Almost due east of San Marcos. and about equidistant from the Río Covianes and San Marcos.
8. *Conostegia xalapensis* ["Rancho Guerro"], 15 June, POM 77167; "Open branched shrub 15 to 20 feet tall"
306. "*Arbutus*" *Brysonima* ["Rancho Guerro"], 15 June, POM 77218; dupl. scrips. ?Munz, POM 77217
309. "*Arbutus*" *Byrsonima crassifolia*, 15 June, POM 77219
423. *Cladocolea oligantha* ["Rancho Guerro"], US
443. "*E[uphorbia] peganoides*," 15 June, POM 85784; script unknown, "Ranono Querro"; probably intended for "Rancho Guerro," which is [La] Higuera

JAYAMITA, COLIMA
83. *Acalypha filipes*, 1 July
83. "*Euonymus*" (*Acalypha coryloides*), 1 July, POM 84508; "Jayamita, Jalisco"
164. *Caesalpinia sclerocarpa*, 1 July, (2nd sheet, POM 28652)
168. *Caesalpinia coriaria* [label typed], 1 July, POM 26670; also two fragments on POM 26670. The sheet with 2nd label hand-written, not by Jones: Locality "Colima, Mex.," 2 July; "Called 'Gall tree' pod used to tan hides. Locust-like tree - 10–30' high"

La Palma, Jalisco
s.n. *Dyschoriste mcvaughii* ["paratype"; scrips. Munz], 7 June
s.n. "*Waltheria americana*," 7 June, POM 84125
s.n. "*Heteropteris laurifolia*" ["Shrub 6–20 ft, half climbing, along streams"], 9 June, POM 77542
s.n. *Hymenocallis jaliscensis* Jones, 9 June, POM 119360
s.n. *Marina diffusa*, 7 June, POM 27674
s.n. "*Crotalaria*," 7 June, POM 27424
s.n. "*Arenaria*," 9 June, POM 101142
s.n. *Dryopteris patens*, 7 June, POM 121220
s.n. *Polypodium incanum*, 8 June, POM 120084
s.n. *Polypodium* (*Blechnum*), 8 June, POM 121074
s.n. *Asplenium fragrans*, 9 June, POM 120860
s.n. *Gymnogramme* (*Pityro-*), 8 June, POM 121281
s.n. *Adiantum*, 9 June, POM 120312
s.n. *Bommeria* (*Gymnogramme*), 9 June, POM 121274
2. *Ardisia revoluta* [scrips. Jones exc. name; det. Thorne], 7 June, POM 77453; duplicate with typed label, POM 89333
7. *Piper leucophyllum* [scrips. Jones exc. name; det. Thorne], 7 June, POM 86793; duplicate with typed label, "Shrub 10 feet high,"POM 86773
19. *Heteropterys floribunda* [typed: "Small shrub, 6 to 20 feet or more high, half climbing. Stems 1–3 in. diam."], 9 June, POM 84733
33. *Ficus jonesii* [isotype (= *F. glaucescens)*], 7 June; scrips. Jones exc. name, POM 86291; typed label: POM 86883; "A very large tree, with the general appearance and habit of the mahogany (caoba) or Gleditschia triacanthos many ash trees"
43. *Bursera* [typed], 9 June, POM 86502; "Shrub, 3–10 feet high, like Corylus rostrata in habit"
48. *Jarilla heterophylla*, 9 June
56. *Iresine* [typed description], 8 June, POM 102563; "also at Chiquilistlan"
59. *Dorstenia Drakaena* [typed], 7 June, POM 86475; "Root 1–2 in long, with light-red rootlets from its entire length but the strongest are from the end. rootstock erect. Grows in the shade"
66. *Rauwolfia heterophylla*, 7 June, POM 75820
85. *Thalictrum*, 9 June, POM 100098; [typed] "Root leaves (?round red) almost entire, 1 in diam."
87. *Pinguicula oblongiloba*, 9 June, POM 85804
110. *Sida rhombifolia*, 9 June, POM 84029
116. *Oxalis*, 9 June, POM 86748
117. *Ionoxalis macrocarpa* ["type"], 9 June, US
117. *Oxalis* [all typed], 9 June, POM 86751; "Pods linear, acute inch long, Seeds chestnut colored, a line long, oval, acute at each end, longitudinally grooved and deeply cross-pitted"
131. (?731) *Macrosiphonia hypoleuca*, 7 June
153. *Coriaria thymifolia "ruscifolia*," 8 June, POM 28641, POM 28640
183. *Inga spuria* [typed], 9 June, POM 28216; scrips. in unknown hand: "Large tree like Juglans nigra, but spreads very widely like the apple, 30–40 feet high, bark like the black oak but soft"
211. *Cologania procumbens*, 9 June

La Palma, Jalisco (cont.)
237. *Valeriana densiflora*
380. *Salvia palmae* ["type" ex Epling (not located at US)], 9 June, POM 76691
387. *Pedicularis jonesii* ["type"], 9 June
416. *Acalypha*, 9 June, POM 87101
417. same *Acalypha* (?) ["narrow leaves"], 9 June, POM 86792
417. *Acalypha multispicata*
433. *Euphorbia hypericifolia* [2 copies], 9 June, POM 86288
433. *Chamaesyce nutans*, US (not seen)
434. *Chamaesyce hirta* [cf var. *nocens* ex V. W. Steinmann], 9 June, POM 86253
457. *Bessera elegans*, 9 June
460. *Polianthes*, 9 June
462. *Encyclia pterocarpum*, POM
464. *Encyclia aenicta*, 9 June
465. *Spiranthes lanceolata*, 9 June, POM
466. *Pitcairnia ?palmeri*, 7 June
467b. *Adiantum capillus-veneris*
472. *Sisyrinchium*, 9 June
473. *Tigridia* or *Nemastylis*, 9 June
477. *Fimbristylis pentastachya*, 9 June
484. *Selaginella pallescens*, 9 June
497. *Adiantum thalictroides*, 9 June
497b. *Adiantum thalictroides*, 7 June, POM
509. *Polypodium angustum*, 8 June, POM
533. *Notholaena galeottii*, 7 June
735. *Stachys coccinea*, 8 June, POM 80030
739. "*Desmanthus*" "*Zapoteca*," 8 June, POM 29494
741. *Cyperus brevifolius*, 9 June
741. *Hexadesmia ?crucigera*, 9 June
743. *Pleurothallis ciliaris*, 9 June
744. *Bletia macristhmochila*, 9 June
746. *Cuphea*, 9 June, POM 69540
751. *Ranculus petiolaris*, 9 June, POM 99304

Manzanillo, Colima
s.n. *Mimosa pigra*, 25 June, POM 28628; typed: "Shrub, 6–20 feet high, intricately and openly branched"
s.n. *Agave colimana* Gentry [det. McV 1977], June, POM 109143
5. *Coccoloba sessiliiflora* ["Small tree" typed], 25 June, POM 28998
9. *Capparis*, 25 June, MSC
13. *Stegnosperma halimifolium*, 25 June, MSC
15. *Laguncularia racemosa*, 25 June
32. "Malpighiaceae" (but lvs alternate) [typed, "Fig"], 25 June, POM 84025
100. (typed, inked over to 200) "*Acacia*" "*Prosopis*" "Called mesquit," 25 June, POM 28630
103. *Podopterus cordifolia* Rose & Standl. [isotype], 25 June, POM 86552
141. *Indigofera suffruticosa* [typed label], 25 June, POM 28019; "Bush 6 feet high, very open branches long, erect"
141. "*Indigofera anil*" [scrips. Jones exc. name], 26 June, POM 26676
167. *Caesalpinia eriostachys* [name scrips. Jones, label otherwise typed], 25 June, POM 28333

MANZANILLO, COLIMA (cont.)
179. *Crataeva tapia* [det. Iltis], 25 June, POM 84247
189. *Acacia hindsii*, 25 June, scrips. Jones exc. name, POM 29014; typed label, POM 28623; "These spines are the product of a most pugnacious and venomous little ant, each spine being an ant colony. Normally the spines are 12 lines long and a line wide and little inflated,"
193. *Mimosa laxiflora* var. *zygoph.*, 25 June
201. *Mimosa pigra*, 25 June
201. *Mimosa rosei* [det. Barneby], 25 June, POM 28629
231. *Ludwigia leptocarpa* ["Prostrate. Fls yellow"], 30 June, POM
271. "*Dysodia*" (?*Pectis*), 25 June; POM 67061
432. *Chamaesyce thymifolia*
438. *Combretum laxum* ["*mexicanum*"], 25 June, POM 83660
452. ?*Agave geminiflora* ["on rocks touched by sea spray"], June
543. *Caesalpinia crista*, 25 June

MILAGROS, ZACATECAS (Milleagres, Milleagros)
249. Opuntia, 4 May, POM 83298
252. Opuntia, no date, POM 83214

MOJADA, MOJADA MTS., see Sierra Mojada.

OJO CALIENTE, ZACATECAS
s.n. *Argemone ochroleuca* [det. Ownbey], 9 May, POM 97756; probable duplicate of POM 97754, Jones 86
s.n. *Oenothera kunthiana*, 9 May, POM 38610
s.n. *Teucrium cubense* [det. McClintock], 9 May, POM 69566
s.n. *Tragia ramosa*, 9 May, POM 86342
s.n. *Chenopodium glaucum*, 9 May, POM 103294
s.n. [*Astragalus*] *hypoleucus*, 9 May, POM 45804
s.n. *Baccharis pteronioides*, 9 May, POM 41767
86. *Argemone ochroleuca*, 9 May, POM 97754, 97755
113. *Oxalis albicans*, 9 May, POM 86782
151. *Lotus puberulus*, 9 May, POM 27893
158. *Dalea bicolor*, 9 May, POM 26675, POM 28928
264. *Aphanostephus humilis* [det. Blake], 9 May, POM 34082
312. *Asclepias brachystephana*, 9 May, POM 75830
382. *Loeselia coerulea*, 9 May, POM 74891
397. *Lobelia laxiflora* var. *angustifolia*, 9 May, POM 68364; "Flowers yellow"
406. *Chenopodium inamoenum* [det. Wahl], 9 May, POM 103297
413. *Croton*, 9 May, POM 86734
415. *Acalypha monostachya*, 9 May, POM 86730; see also no. 415 under Tuzpan, Jal.
428. *Euphorbia stictospora*, 9 May, POM 86134
550. *Atriplex muricata*, 9 May, POM 102886
552. *Nama undulatum*, 9 May, POM 73691
553. *Plantago*, 9 May
557. *Aphanostephus humilis*, 9 May
558. "mixture of *Bahia* etc," 9 May
559. *Aphanostephus humilis*, 9 May
562. *Gaura coccinea* [det. Raven], 9 May, POM 46360
565. *Sida abutifolia* [det. P. Fryxell], 9 May, POM 85186

OJO CALIENTE, ZACATECAS (cont.)
566. *Drymaria*, 9 May, POM 117068
567. *Lepidium oblongum*, 9 May, POM 94074
587. "*Acacia constricta*" (=?*Mimosa*), 30 Apr, POM 28438

PASTORILLA (PASTORÍA), ZACATECAS
s.n. [*Astragalus*] *hypoleucus*, 2 May, POM 45799
228. *Ludwigia tepicana* ["type"], 2 May
228. *Heimia salicifolia*; label typed, POM 38095; smaller duplicate, scrips. Jones exc. name, POM 83688
316. *Asclepias longicornu*, 7 May, POM 75835
385. Buddleia sessiliflora [det. Norman], 2 May, POM 76626
425. ?*Jatropha*, 2 May, POM 85644
568. *Asclepias exilis* [type ex Munz], 2 May, POM 76066

PIHUAMO, MICHOACÁN
s.n. *Castillea nervata* Eastw., 16 June, POM 69367
s.n. *Bacopa vandellioides*, 16 June, POM 45100
s.n. *Bouvardia*, 16 June, POM 67585
s.n. *Ludwigia octovalvis*, 16 June, POM 46277
s.n. *Drymonia* (A, B, D & indet.), 16 June, POM 69020
s.n. *Tillandsia*, 16 June, POM 109082
s.n. ?*Thevetia*, 16 June, POM 77392
6. *Dioscorea mitis*, 16 June
18. *Calyptranthes pallens*
51. *Dioscorea*, 20 June; "vine like the grape and very tall, going to the top of tall trees"
61. *Cissus verticillata*, 16 June
68. "*Cordia*," 20 June, POM, US
68. "*Rauwolfia heterophylla*," 20 June, POM 86471
163. *Pithecellobium dulce*, 16 June
163. "*Cassia*" [*Machaerium salvadorense* ex Rudd 1973], 16 June, POM 29587
171. *Cologania*, 16 June
171. Mixed "*Cassia*," *Crotalaria*, *Eriosema*, 16 June, POM 29582
214. *Brongniartia inconstans*, 20 June
307. *Ardisia compressa*, 16 June, POM 76404
435. *Euphorbia hypericifolia*, 16 June, POM 86285
461. *Epidendrum ciliare*, 16 June, POM
498. *Adiantum thalictroides*, 16 June, POM
501. *Adiantum trapeziforme*
504. "*Blechnum*," 16 June
511. *Polypodium incanum*, 16 June
514. *Pityrogramma calomelanos*, 16 June
527. *Asplenium*, 16 June
528. *Blechnum occidentale*, 16 June
680. *Heliotropium*, 16 June, POM 72288
683. *Calathea atropurpurea* [det. H. Kennedy], 16 June

RAMOS, ZACATECAS
s.n. "*Teucrium*," 5 May, POM 60044
s.n. *Baccharis pteronoides*, 5 May, POM 37528
s.n. *Astragalus racemosus* var. *brev*, 5 May
17. "*Lycium*" *Condalia ericoides*, 6 May, POM 114062, POM 84571
150. *Astragalus racemosus* var. [scrips. Jones], 5 May, POM 45764
373a. *Teucrium laciniatum* [scrips. Jones exc. name], 5 May, POM 70294
373a. *Teucrium cubense* [det. McClintock], 5 May, POM 69548
451. "*Yucca*," 5 May, fragm., POM, 2 specimens

SACOALCO, JALISCO (Zacoalco de Torres)
27. *Malpighia cordata* Small, 16 July, POM 86503; "Isotype"; original label typed, number clearly 27, as recorded by F. K. Meyer (JE)
37. *Malpighia cordata* Small, 16 July, POM 84576; evidently a duplicate of POM 86503, original number clearly typed 37, but interpreted by F. K. Meyer (JE) as 27
58. *Iresine*, 16 July, POM 102565
199. *Mimosa monancistra*, 16 July, POM 28442
213. *Pachyrrhizus* [scrips. Jones exc. name], 16 July, POM 27059; duplicate label typed, POM 28553; "Leaves entire to 5-toothed or 5-lobed on the same plant"
217. *Gronovia scandens* [typed], 16 July, POM 68269; "Plant is an annual"
319. *Philibertia pavonii*, 16 July, POM 76073; "woody vine 4 feet high"
352. *Thevetia* [scrips. Jones], 17 July, POM 75412
519. *Sarcostemma pannosum*, 16 July; all scripsit Jones; not 319 as reported
575. *Enslenia*, 16 July
576. *Cleome chapalensis* ["1st coll."], 16 July, POM 93793
577. *Ruellia*, 16 July

SALCILLO, JALISCO (Salsillo)
s.n. *Oxalis drummondii*, 1 June, POM 86750
s.n. *Allionia*, 1 June, POM 117271
s.n. *Pellaea*, 2 June, POM 120738
s. n. ?family, 1 June, POM 100423
s.n. *Tauschia nudicaulis* [det. L. Constance1981], 1 June
s.n. *Calliandra*, 1 June, POM 28242
s.n. *Euphorbia eriantha* ?, 1 June , POM 85474
20. *Galphimia glauca* [typed: "Shrub 8 feet high, like the lilac in habit"], 1 June, POM 84513
25. *Aralia* ["like elder, a bush"], 1 June, POM 77826
41. *Bursera* [typed: "Very much branched, apple-tree-like shrub 10 feet high. Grows on rocks"], 1 June, POM 86499
41. *Bursera* [scrips. Jones exc. name], 1 June, POM 117126; same species as POM 86499
106. *Vitis tiliifolia* ["Salc[illo], along the creek"], 1 June
182. *Calliandra* (*bella*) *anomala*, 1 June, POM 28241; POM 29009; typed: "Broom-like shrub stems not branched, 4–8 feet high. Flowers purple, a very handsome plant"
257. *Opuntia icterica* [det. Scheinvar], 1 June, POM 83415
399. *Cuphea llavea*, 1 June, POM 69219; "Also San Marcos, Santa Cruz"

SALCILLO, JALISCO (Salsillo) (cont.)
419. *Colubrina ehrenbergii*, 1 June, POM; "on rocks on hillsides"
448. *Agave* (fls.), 1 June
451. "*Yucca*," 1 June, POM
456. *Weldenia candida*, 1 June; "open places near streams"
458. *Hymenocallis jaliscensis*, 1 June; "type," POM 119358; s.n. "9 June," POM 119369
497b. *Adiantum thalictroides*, 1 June, POM
517. *Pityrogramme* ("*Gymnogramme*"), 1 June
756. indet. fragm, 1 June, POM 86491

SALINAS, ZACATECAS
247. *Opuntia*, 4 May, POM 83296
286. Compositae (no name), 4 May, POM 66854
573. *Opuntia* ["Camp Silvio"], 4 May, POM 83285

SAN MARCOS, JALISCO ("Colima," sensu Jones)
s.n. *Richardia*, 21 June, POM 69258
s.n. *Castilleja nervata* Eastw., 21 June, POM 69309
s.n. "*Cuphea llavea*," 21 June, POM 69220
s.n. *Pitcairnia*, 21 June, POM 109081
s.n. *Polypodium thysanolepis*, 21 June, POM 120082
s.n. *Polypodium* (*Blechnum*), 21 June, POM 121073
s.n. *Pteris*, 21 June, POM 120248
215. *Crotalaria*, 21 June, POM 27425, POM 27426
486. *Selaginella* "*delicatissima*," 21 June
497a. *Adiantum thalictroides*, 21 June
499. *Adiantum concinnum*, 21 June
503. *Aspidium trifoliatum*, 21 June
512. *Pteris longifolia*, 21 June, POM 120249
512. *Polypodium*, 21 June, POM 12107
513a. *Pityrogramma tartarea* var. *fallax* Domin [lectotype ex Morton 1969], 21 June, POM 121273
513. *Pityrogramma tartarea*, 21 June
515. *Pityrogramma dealbata*, 21 June
516. *Notholaena candida*, 21 June
529. *Thelypteris puberula*, 21 June
666. *Cyperus odoratus*, 21 June

SAN MIGUEL, ZACATECAS
s.n. "*Petunia*" ["Lake near San Miguel"], 6 May, POM 69341
s.n. *Oenothera rosea*, 6 May, POM 38420
s.n. *Astragalus triflorus* [Lake, near San Miguel], 6 May, POM 25896
s.n. *Oenothera rosea* ["Lake Ness (?near) San Miguel"], 6 May, POM 38421
s.n. *Aster* [Lake near San Miguel], 6 May, POM 39500
s.n. *Apium depressum* ["type," scrips. Jones], 6 May, POM 82793
147. *A*[*stragalus*] *nuttallianus*, 6 May, ["not sent"] POM 45900
157. *Marsilia minuta* (*vestita*), 6 May, POM 67721; "near San Miguel. Margin of brackish lake, in small mats *in* the ground"
234. *Oenothera rosea* [typed; no date], POM 38419; "Borders of a lake near San Miguel. This is a perennial, blooming the first year"

373. *Teucrium cubense*, 6 May, POM 69549; "Lake near San Miguel"
588. "*Coldenia*" *Nama undulatum*, 16 May [sic], POM 69355; "Lake near San Miguel"
592. [*Astragalus*] *hypoleucus*, 6 May, POM 45797; "Lake near San Miguel"

SANTA CRUZ, JALISCO
s.n. "*Colubrina*" or "*Ziziphus*," 6 June, POM 86568
s.n. ?*Guazuma*, 3 June, POM 86469
s.n. "probably *Mecardonia*," 6 June, POM 43626
s.n. "*Cassia*" *Pithecellobium dulce*," 4 June, POM 29584
s.n. *Quercus polymorpha* [det. C. H. Muller], 3 June, POM 106184
s.n. *Cuphea llavea*, 3 June, POM 69221
s.n. *Notholaena candida*, 4 June, POM 120436
s.n. *Encyclia lancifolia*, 4 June, POM 114044
s.n. ?*Iresine*, 4 June, POM 102566
s.n. *Brongniartia* ("*Cassia*"), 4 June, POM 29590
s.n. *Enterolobium* ("*Acacia*"), 6 June, POM 28632; fruit
s.n. *Enterolobium* ("*Acacia*"), 6 June, POM 28632; leafy branch
s.n. "*Cassia*" (not that), 6 June, POM 29580
s.n. *Asclepias curassavica* [det. R. E. Woodson], 3 June, POM 75838
728. "*Evolvulus*" (?*Turnera*), 14 June
s.n. *Asclepias senecionifolia*, 14 June
s.n. *Asclepias senecionifolia* [scrips. Munz], 14 June, POM 76072
s.n. *Asclepias senecionifolia*, 14 June
22. *Stillingia zelayensis*
28. *Psidium* [typed; "Called Guayava. Small tree"], 3 June, POM 117310
45. *Bursera* [typed], 4 June, POM 86497; "Called copal. Tree 40 feet high with bark of paper birch red open branches a very graceful tree, with much varnish like gum"
50. *Cissampelos* ["Pistillate of 49 ?"], 4 June, POM 100402
67. *Agonandra racemosa* ("*Prunus*"), 7 June, POM 89339
82. *Ziziphus amole*, 6 June
115. *Oxalis drummondii* [typed; "Same as 114?"; 114 is from the Volcano of Colima], 7 June, POM 86766
132. *Casearia* ("*Prunus*"), 3 June, POM 89335; "Apple like tree, very open, called "Cerhuela" or plum. Fruit delicious"
144. *Brongniartia vicioides* ?, 4 June, POM 27280; "Low and suffrutescent"
162. *Cassia emarginata* (*Senna*), 4 June
165. *Tamarindus indica* [typed], 7 June, POM 29681; "Tamarind, 50 feet high, very widely spreading, bark like the locust"
184. *Pithecellobium acatlense* [typed], 4 June, POM 28217; duplicate no., scrips. Jones exc. name, POM 29010; "Shrub 10 ft. high"
190. *Pithecellobium tomentosum*, 6 June
192. *Pithecellobium tomentosum*, 4 June, US
192. *Acacia macilenta*, 4 June
202. *Enterolobium cyclocarpum*, 6 June
206. *Mimosa albida* [106 typed, inked 206], 4 June, POM 83717; mixture of Leguminosae, Malpighiaceae, Rubiaceae
212. *Cologania*, 7 June
226. (?*Struthanthus*), 6 June, POM 67579
377. *Salvia sessei* [det. Epling], 3 June, POM 70187
377. *Buddleja ?floccosa*, 3 June

SANTA CRUZ, JALISCO (cont.)
379. *Waltheria indica*, 7 June
412. *Croton ciliatogland.*, 3 June, POM 87132
422a. *Chamaesyce hirta*, 6 June, POM 86240; "Sta Cruz SW of Chiquilistlan"
*423. *Chamaesyce hirta*, US
459. *Sprekelia formosissima*, 7 June
475. *Fimbristylis spadicea*, ?4 June
724. (?Verbenaceae), 6 June
726. "*Iresine*," 4 June
728. "*Evolvulus*" (?*Turnera*), 14 June

SANTA CRUZ NO 2, JALISCO
s.n. *Castilleja*, 14 June, POM 69365
s.n. *Cuphea llavea*, 14 June, POM 69218
2. "*Cassia*" (=*Aeschynomene*), 14 June, POM 29488
47. *Ludwigia peploides* [typed], 14 June, POM 38135; "Spreads by rooting, in wet place"
346. cf. Evolvulus, 10 June, POM 71166

SANTA ROSALÍA, ZACATECAS
614. *Nama hispidum* (*spathulatum*), 15 May, POM 73490

SAYULA, JALISCO
s.n. ?*Thevetia*, 26 May
291. *Baccharis heterophylla* [scrips. Jones exc. name], 27 May, POM 40306
291. *Baccharis heterophylla*, 27 May, POM 37323
354. *Passiflora foetida*, 26 May, POM 84176
570. *Phoradendron carneum*, 26 May

SIERRA MOJADA MOUNTAINS, COAHUILA (often Sierra Mojada or "Mojada" only)
s.n. *Ptelea* [scrip. Munz], 19 Apr, POM 86898, POM 86959
s.n. *Polygala longa* Blake [det. Wendt], 20 Apr, POM 86385 (?dupl of POM 86381, Jones 97)
s.n. *Giliastrum purpusii* [scrips. Jones exc. name], 20 Apr, POM 74988; see also no. 348, POM 74721
s.n. *Senna lindheimeriana*, 19 Apr, POM 28407
s.n. *Atriplex greggii*, ?19 Apr, POM 103087
s.n. *Croton*, 20 Apr, POM 87330
s.n. "*Calliandra*," 20 Apr, POM 28220
s.n. *Pellea wrightiana*, 19 Apr, POM 120803
s.n. *Notholaena aschenborniana*, 19 Apr, POM 120714
s.n. *Notholaena pringlei*?, 19 Apr, POM 120456
42. *Aristolochia*
52. *Aristolochia wrightii* [det. Pfeifer], 19 Apr, POM 15941; "Flowers almost black. Woody at base. Along dry stream beds"
52. *Aristolochia wrightii*. [scrips. Jones; no descriptive note], 19 Apr, POM 117675
97. *Polygala longa* Blake [det. Wendt], 20 Apr, POM 86381
98. *Polygala robinsonii* [det. Wendt], 19 Apr, POM 86380
99. *Polygala scoparioides* [det. Wendt], 19 Apr, POM 86382; apparent duplicate POM 86509

100. *Polygala scoparioides* [det. Wendt], 19 Apr, POM 86510; better duplicate is POM 86383
101. *Polygala alba* Nutt. [det. Wendt], 19 Apr, [scrips. Jones exc. name] POM 86508; typed label, POM 86386
102. *Polygala watsonii* Chodat [det. Wendt], 20 Apr, POM 86513, POM 86384
107. *Linum rigidum*, 19 Apr, POM 87198
125. *Ceanothus greggii*, 19 Apr, POM 85238
134. *Cercocarpus mojadensis* [isotype], 19 Apr, [long typed description] POM 89493; POM 90138
159. "*Dalea formosa*" ["not sent"], 19 Apr, POM 28918
160. *Dalea*, 19 Apr, POM 29114
161. *Dalea wrightii*, 19 Apr, POM 29109
169. "*Cassia*" [*Sophora secundiflora* det. Rudd], 19 Apr, POM 29586; "Bush about 10 feet high"
194. *Acacia roemeriana*, 19 Apr, POM 28439; POM 26685
195. *Acacia filicina*, 20 Apr, POM 26686
197. *Mimosa* (*Acacia*) *texana*, 19 Apr, POM 28441, POM 26682
198. *Mimosa* sp. [ex Barneby 1985], 19 Apr, POM 28442, POM 26681, POM 28441 p.p.
233. *Calylophus hartwegii*, 20 Apr, POM 38418
284. *Bahia*, 20 Apr, POM 66654
293. *Chrysactinia mexicana*, 19 Apr, POM 30120
298. *Chaptalia* [scrips. Jones], 19 Apr, POM 35632
299. *Acourtia nana* [det. Villaseñor 1990], 19 Apr, POM 38961
310. *Comarophylis polifolia*, 19 April, POM 76733
314. *Asclepias capricornu*, 19 Apr, POM 76022
323. *Heliotropium torreyi*, 19 Apr, POM 262344
328. "*Lithospermum*," 19 Apr, POM 262350
330. *Fraxinus nummularis* [isotype], 19 Apr, POM 76617
331. *Ruellia* [det. T. F. Daniel], 1984, 19 Apr; POM 70325
348. "*Gilia rigidula*" [ex ?Munz] [*Giliastrum* purplish], 19 Apr, POM 74721; "Also at Pastorilla," and in annot. pasted & typed, "Blue Gilia. Flowers open at 9 o'c a.m. and close at about 4 o'c p.m. Sierra Mojada Mexico April 18 1892"
353. *Loeselia greggii*, 19 Apr, POM 74933
356. *Hibiscus coulteri*, 19 Apr, POM 85054
366. *Buddleia marrubiifolia* [det. Norman], 19 Apr, POM 69547
368. same *Buddleia*, 19 Apr, POM 70326
383. *Salvia roemeriana*, 19 Apr, POM 70186
405. [*Amaranth*], 20 Apr
411. *Tragia ramosa* [det. Urtecho], 20 Apr, POM 86343
414. *Acalypha hederacea*, 20 Apr, POM 87098
420. *Calylophus hartwegii*, 20 Apr, POM 39929
424. *Jatropha* "*dioica*" [scrips. Jones], 19 Apr, POM 85571
424. same *Jatropha*, 19 Apr., POM 86409
430. *Euphorbia villifera*, 19 Apr, POM 87468
431. *Euphorbia cinerascens*, 19 Apr, POM 86132
443. *Quercus intricata* Trel. [det. C. H. Muller], 20 Apr, [scrips. Jones exc. name] POM 106183; typed label, POM 106274
450. cf. *Hechtia* , 19 Apr; "on rocks in dry places"
476. *Carex* (too young), 20 Apr
482. *Melica laxiflora*, 19 Apr

SIERRA MOJADA MOUNTAINS, COAHUILA (cont.)
483. *Selaginella leptophylla*, 19 Apr
491. *Juniperus monticola*, 19 Apr
518. *Pellaea microphylla*, 19 Apr (18 Apr on one sheet), POM
519. *Notholaena greggii*, 19 Apr
520. *Cheilanthes* (*Notho.*) *palmeri*, 19 Apr, POM
521. *Cheilanthes microphylla*, 19 Apr, POM
531. *Notholaena aschenborniana*, 19 Apr, POM
532. *Cheilanthes villosa*, 19 Apr
542. *Notholaena sinuata*, 19 Apr
601. *Notholaena standleyi*, 19 Apr
604. *Bouteloua*, 19 Apr
609. *Carlowrightia*, 19 Apr
622. *Lesquerellq purpurea*, 19 Apr, POM 95989
623. *Greggia*, 21 Apr, POM 95929
624. *Sisymbrium vaseyi*?, 20 Apr, POM 94639
632. *Nama undulatum*, 20 Apr, POM 73759
633. "*Oxybaphus linearifolius*," 20 Apr, POM 102492
635. *Salvia greggii* [det. Epling], 20 Apr, POM 70203
637. *Aristida purpurea*, 20 Apr
638. *Cheilanthes eatonii*, 20 Apr

TAPALPA, JALISCO
s.n. *Crataegus*, 27 May, POM 91729
s.n. *Pinus*, 27 May, POM 120050
s.n. *Pinus*, 10 June, POM 120648
s.n. *Pellaea*, 10 June, POM 120798
77. *Rhamnus mucronata*
103. *Lupinus reflexus* [det. C. P. Smith], 27 May, POM 24586
?121. ?Verbenaceae [opp. lvs.] "*Tournefortia*" [label illegible], POM 71325
121. "*Viburnum*," 10 June, POM 86247
133. *Ximenia parviflora*, 31 May, POM 89274; all typed: "8000 ft among pines." "A low barberry like shrub with all the lower branches prostrate, and very slender"
191. *Mimosa adenantheroides* [det. Barneby], 10 June, [typed] POM 28626; [scrips. Jones] POM 29017
191. duplicate *Mimosa polyancistra*, 10 June
203. *Lupinus ehrenbergii*, 27 May
308. *Arbutus tesselata*, 11 June, POM 77220; [scrips. Jones] POM 77248
318. *Asclepias constricta*, 10 June
320. *Asclepias constricta*, 10 June, POM 76060; [scrips. Munz] POM 76061; [scrips. Jones] POM 75824
381. *Prunella vulgaris* ["Not sent."], 10 June, POM 70092
422. *Euphorbia radians*, 27 May, POM 85513; US
469. *Hypoxis fibrata*, 10 June
470. *Commelina scabra*, 10 June, POM
761. *Polygala*, 10 June, POM 86390
762. "*Polygala* (*Krameria* ?), 10 June, POM 86989
767. *Anemia*, 10 June

TONILA, COLIMA
s.n. *Cisampelos*, 8 July, POM 100405
s.n. "*Cassia*" (*Aeschynomene*), 11 July, POM 29489
s.n. *Polypodium thysanolepis*, 8 July, POM 120083
220. *Guettarda elliptica*, 8 July, MSC
281. *Calea palmeri* [scrips. Jones, exc. name], 1 July, POM 40305
418. *Acalypha* [scrips. Jones, exc. name], 8 July, POM 86826
418. ?same *Acalypha* [typed label; "Shrub"], 8 July, POM 86899
500. Adiantum patens, 8 July, NY, POM
506. *Polypodium thyssanolepis*, 8 July, POM
509a. *Polypodium angustum*, 8 July, POM
510. *Polypodium lineare*, 8 July
530. *Pellaea aspera*, 8 July
534. *Cheilanthes kaulfussii*, 8 July
537. *Anemia hirsuta*, 8 July, US
539. *Aspleniium fragrans*, 8 July
540. *Bommeria pedata*, 8 July, POM
640. *Notholaena* "*incana*," 8 July

TUXPAN, JALISCO ("Tuzpan")
s.n. *Bursera*, 15 June, POM 86501
1. *Clethra* [scrip. Jones], 15 June, POM 77541
1. *Clethra*, ?same [typed], 15 June, POM 85631
49. *Cissampelos pareira* [scrips. Jones exc. name], 15 June, POM 100401
172. *Eriosema grandiflorum*, 15 June, POM 29581
176. *Diphysa suberosa* [scrip. Jones], 15 June, POM 28995; typed: "Shrub 2–10 feet high like the ordinary Acacias"
205. *Desmodium plicatum*, 15 June, POM 29182
415. *Acalypha* [illeg. typed label], 15 June, POM 86789
415. same *Acalypha* [scrip. Jones], 15 June, POM 86856
415a. *Acalypha grisea*, 15 June
593. *Tillandsia recurvata* [det. L. B. Smith], 15 June
594. *Tillandsia tenuifolia* L. [?det. L. B. Smith], 15 June
595. *Agave* cf. *pedunculifera*, 15 June
597. *Aeschynomenne petraea*, 15 June, POM 29246

VOLCANO OF COLIMA (Volcan)
s.n. *Salix* [unknown to Ball, and Argus], 13 July, POM 106706
s.n. *Solanum tuberosum* var. *boreale*, 13 July, POM 69820
s.n. *Alchemilla*, 13 July, POM 9011-
s.n. [*Valeriana clematitis*, cf. #4], 13 July, POM 84592
s.n. *Ranunculus petiolaris* [det. Benson], 14 July, POM 100539
s.n. [*Lupinus*] *montanus* [scrips. Jones], 13 July, [fruit]POM 24591
s.n. [*Lupinus*] *montanus* [scrips. Jones], 13 July, [flowers]POM 24589
s.n. *Calliandra*, 14 July, POM 28243
s.n. *Cerastium*, 13 July, POM 101591
s.n. *Polypodium madrense*, 14 July, POM 120086
4. *Valeriana clematitis* [det. F. Meyer] ["middle elevations"], 13 July, POM 84592

VOLCANO OF COLIMA (Volcan) (cont.)
10. *Struthanthus condensatus*, 14 July, [typed: "middle elevations"] POM 83676; [scrips. Jones] POM 117676
88. *Draba jorullensis* ["alpine"]
88. *Draba jorullensis*, 13 July, POM 94315
92. *Arenaria oresbia* ["alpine"], 13 July, POM 101531, POM 117060
93. *Arenaria bryoides* ["alpine"], 13 July, POM 101541, POM 117063
94. "*Drymaria*" (*Arenaria*), 13 July, POM 117079
95. *Arenaria ?saxosa* ["alpine"], 13 July
95. *Arenaria*, 13 July, POM 117061
96. "*Drymaria*" (*Arenaria*), 13 July, POM 117080
96. *Stellaria ovata*, 13 July
114. *Oxalis* [scrips. Jones], 13 July, POM 85806
114. "*Oxalis drummondii*?," 13 July, POM 86767
122. *Rhus schmedelioides*, 13 July
122. *Rhus*, 13 July, POM 86045
122. *Serjania* ? [scrips. Jones], 13 July, POM 86057
126. *Ceanothius coeruleus*, 13 July, POM 85241
137. *Alchemilla vulcanica*, 14 July
140. *Ribes ciliatum* [all typed], 3 July, POM 92269
156. *Trifolium amabile*, 14 July, POM 27941
156a. *Trifolium amabile*, 14 July
204. *Lupinus reflexus* [type, s.n., Jones scrips.], 13 JulyPOM 24587, POM 24975, POM 24588
216. *Desmodium sp.* [too small to determine], 14 July, (2 species) POM 29181
223. *Symphoricarpos microphyllus*, 13 July, [scrips. Jones] POM 67494; [typed] POM 67587
224. *Fuchsia colimae* ["type"], 13 July, POM 83714
225. *Fuchsia microphylla*, 13 July, POM 83707
232. *Raimannia colimae* Rose ["isotype"], 14 July, POM 38417
236. *Eryngium alternatum* [det. Mathias & Constance 1977], 13 July, POM 82995; "10,000 feet alt. 4–8 feet high"
318. *Asclepias pringlei*, 13 July, POM 76064
318. *Asclepias constricta*, 13 July
324. *Onosmodium*, 14 July, POM 71326
325. *Lithospermum* ? [scrips. Jones], 13 July, POM 71467
325. same *Lithospermum* [typed label], 13 July, POM 262353
326. *Macromeria* ("*Onosmodium*"), 13 July, POM 72251
347. *Cuscuta* on *Lupinus*, 13 July, POM 71171
388. *Castilleja glandulosa*, 13 July
396. *Penstemon kunthii*, 13 July
422b. *Chamaesyce hirta*, 13 July, POM 86242
426. *Euphorbia campestris* [scrips. Jones], 13 July, POM 85605
426. *Euphorbia campestris* [typed label], 13 July, POM 85645
427. *Euphorbia campestris*, 13 July, POM 85646
439. *Alnus jorullensis*, 13 July
447. *Yucca schotti* , 14 July
448. "*Agave*," 13 July, POM; US (1 Jun)

VOLCANO OF COLIMA (Volcan) (cont.)
449. *Agave colimana*, 13 July, POM; US (*A. pedunculifera*)
450. *Dasylirion*, 14 July
451. *Yucca* , 14 July, POM 109485
456. "*Liliaceae*," 13 July
461. *Epidendrum ciliare*, 13 July, POM; US
462. *Encyclia pterocarpum*, 13 July, POM; US
466. *Pitcairnia*, 13 July
468b. *Smilax*, 14 July
478. *Muhlenbergia quadridentata*, 14 July
478a. *Calamagrostis*, 13 July
479. *Piptochaetium virescens*, 14 July
487. *Arceuthobium vaginatum*
490. *Abies*, 13 July
505. *Aspidium trifoliatum*, 13 July
507. *Polypodium* (entire leaf), 13 July
522. *Cheilanthes angustifolia*, 13 July
524. *Asplenium monanthum*, 13 July
526. *Asplenium castaneum*, 13 July
535. *Plecosorus speciosissimus* 13 July
536. *Cheilanthes*, 13 July
595. *Agave pedunculifera*, 13 July, POM
683. *Pteridium aquilinum*, 13 July
685. *Cystopteris fragilis*, 14 July
689. *Triumfetta brevipes*, 14 July
691. *Euphorbia* cf. *francoana*, 13 July, POM 86464
699. *Oenothera kunthiana* [det. P. Raven], 13 July, POM 39328
700. *Geranium*, 13 July, POM 88925

ZACATECAS, ZACATECAS
s.n. *Astragalus diphacus* var. *peonis* ["type" ex Jones], 16 May, POM 45369
s.n. *Oxalis albicans*, 23 June, POM 86787
s.n. *Astragalus humboldtianus*, 4 May, POM 45893
s.n. "*Arenaria*," 23 June, POM 101141
s.n. "*Polygala*" (?*Krameria*), 23 June, POM 86389
s.n. *Dalea argyrea*, 23 Apr, POM 28926
89. *Reseda luteola*, 23 June [sic], POM 85028
91. *Drymaria*, 23 June [sic], POM 117066
123. *Adolphia infesta*, 23 June, MSC; POM 85242; same data and typed: "Low and densely branched shrub"; possibly POM 85401 is the same, but label is illegible.
188. *Calliandra* [very small], 23 Apr, POM 28221
251. *Opuntia*, no date, POM 83215
313. *Asclepias linaria* [scrips. Jones], 23 June, POM 75821
421. *Euphorbia radians*, 23 Apr, POM 85476
480. *Muhlenbergia tenuifolia*, 23 Apr, POM
579. *Erodium cicutarium*, 23 Apr, POM 88766
585. *Opuntia* [with long typed description], 16 May, POM 83284
623. *Lemna*, 23 June

Contr. Univ. Michigan Herb. 24: 173–187. 2005.

# NEW EUPHORBIACEAE FROM MEXICO. II.

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Recent estimates of the number of species of Euphorbiaceae in Mexico vary from 782 (Steinmann 2002) to 826 (Martínez et al. 2002), and the state of Michoacán possesses a rich diversity of these. Rodríguez and Espinosa (1996) reported the presence of 127 species and 19 genera for the state, whereas Martínez et al. (2002) reported 164 species and 20 genera. I estimate that the actual number of taxa is closer to the latter value and even slightly higher with about 185 species and 21 genera present. Here six new species are described from Michoacán.

**Croton atrostellatus** V. W. Steinmann, sp. nov.—TYPE: MEXICO. Michoacán: Mpio. Angamacutiro, along the road from Panindícuaro to Villachuato, 18 km NE of the Guadalajara–México Autopista and 4.5 km NE of Pueblo Nuevo, 20°06'35"N, 101°41'05"W, ca. 1800 m, 19 Jun 2001, *V. W. Steinmann 1681* (holotype: IEB!; isotypes: ARIZ! DAV! MICH! WIS!). Fig. 1.

Frutex 2–5 m altus, monoecius, trichomatibus atris dispersis vestitus; folia alterna, stipulae subulatae, 2.6–6.5 mm longae, petioli 1–3 cm longi, stellato-tomentosi, laminae plerumque ovatae, 2.5–9 cm longae, 1.8–6 cm latae, bicolores, apice acutae vel acuminatae, basi rotundatae vel leviter cordatae, supra stellato-puberulae, subtus stellato-tomentosae, margine serrulato-denticulato; inflorescentiae terminales, floribus pistillatis (4–) 6–9, staminatis usque ad ca. 60, bracteae subulatae vel lineares, 1.2–3.1 mm longae, stellato-tomentulosae; florum staminatorum calyx lobis 5, 2.2–2.8 mm longis, 1.3–1.9 mm latis, petala albida, anguste elliptica, 3.1–3.6 mm longa, stamina 15 vel 16, filamenta filiformia 3.0–3.6 mm longa, villosa, antherae ellipticae, 1.0–1.2 mm longae; florum pistillatorum calyx lobis 5 (6), aequalibus, ovatis vel oblongis, 3.9–5.2 mm longis, 2.8–3.6 mm latis, ovarium trilobatum, stellato-tomentosum, styli 3, bis bipartati, 3.2–3.9 mm longi, filiformes; capsula depresso-subglobosa, ca. 6.5 mm longa et 8 mm lata; semina oblonga, 5.2–5.7 mm longa, 3.8–4.2 mm lata, complanata, nitida, caruncula 0.8–1.0 mm longa, 1.6–2.1 mm lata.

Shrubs, sometimes aborescent, 2–5 m tall, highly branched, drought-deciduous, monoecious; stems stellate-tomentose when young, often with a dingy-yellow cast, with scattered black hairs throughout the whole plant, bark reddish brown. Leaves alternate, well-spaced on the stem; stipules 2.6–6.5 mm long, subulate, pilose to tomentulose; petioles 1–3 cm long, stellate-tomentose, lacking glands; blades 2.5–9 cm long, 1.8–6 cm wide, membranaceous, unlobed, pinnately veined, usually ovate, rarely elliptic or oblong, apex acute to acuminate, base rounded to slightly cordate, distinctly bicolored, adaxially stellate-puberulent, green, abaxially stellate-tomentose, white to dingy yellow, margin serrulate-denticulate, sometimes irregularly so and appearing erose. Inflorescence a terminal racemelike thyrse to 11 cm long with (4–) 6–9 pistillate flowers towards the base and up to ca. 60 staminate flowers along the proximal portion, pistillate flowers sometimes abortive and the inflorescence then appearing unisexual, bracts 1.2–3.1 mm long, subulate to linear, stellate-tomentulose, bracteoles

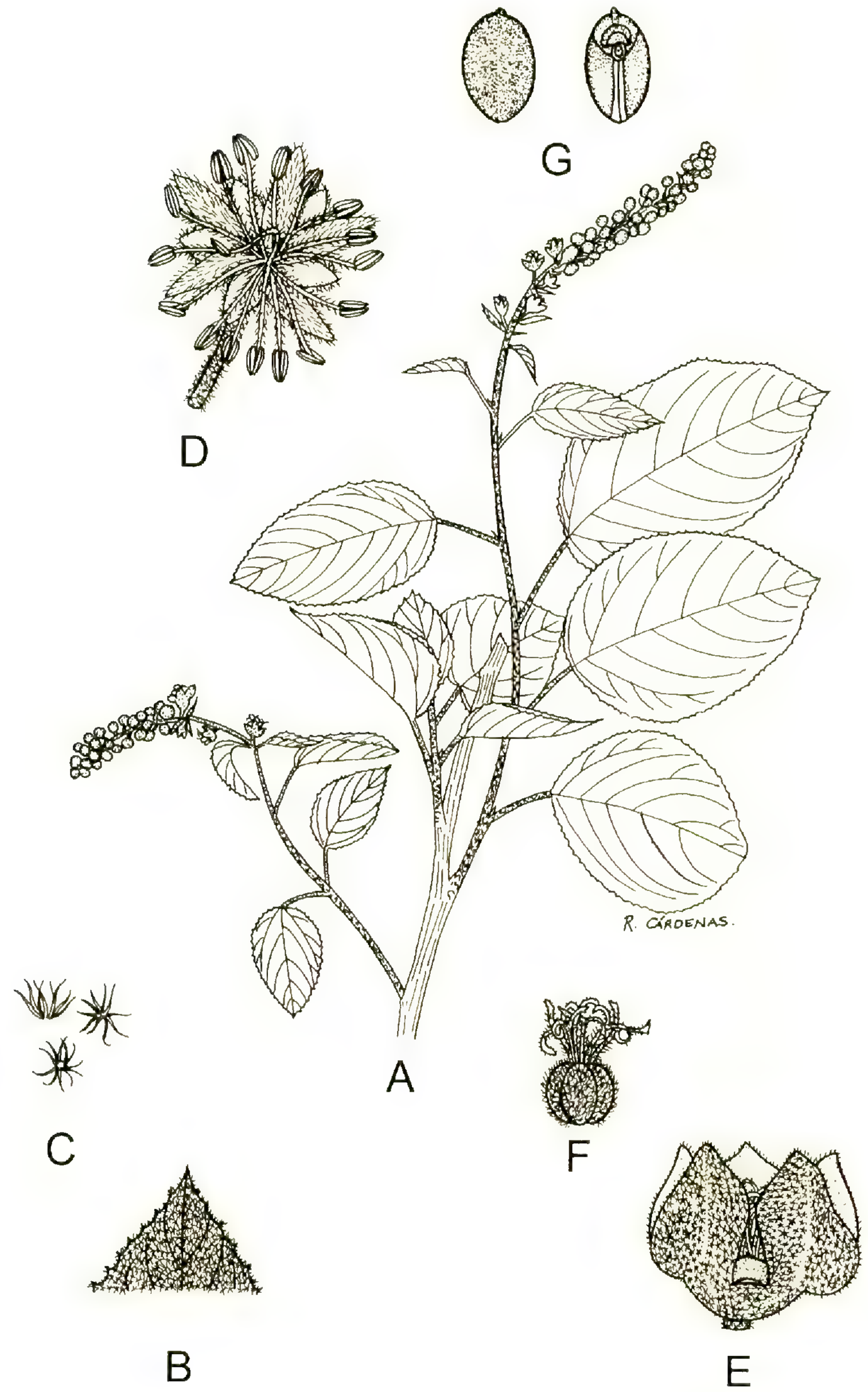



FIG. 1. *Croton atrostellatus*. A. Flowering branch, ×0.5. B. Leaf apex, ×1. C. Stellate hairs, ×20. D. Staminate flower, ×4. E. Pistillate flower, ×4. F. Ovary, ×4. G. Seed, dorsal and ventral views, ×2.

0.4–1.1 mm long, filiform, pilose. Staminate flowers on slender, stellate-tomentose pedicels 2.2–3.1 mm long; calyx 5-partite, lobes 2.2–2.8 mm long, 1.3–1.9 mm wide, triangular-ovate to broadly elliptic, equal, free to nearly the base, apex bluntly pointed, stellate-tomentose on the outside, glabrous within; petals 5, 3.1–3.6 mm long, 0.7–0.9 mm wide, narrowly elliptic, whitish, free to the base, apex rounded, glabrous on the outside, villose within and along the margin; stamens 15 or 16, filaments 3.0–3.6 mm long, filiform and flexuous, villous especially towards the base, anthers 1.0–1.2 mm long, 0.3–0.4 mm wide, narrowly elliptic. Pistillate flowers on stout pedicels 1 mm long or less; calyx valvate-reduplicate (i.e., with adjacent pairs of valvate sepals forming a

projection at the base), sepals 5 (6) united ca. 1/4 to 1/3 their length, the lobes ovate to oblong, somewhat accrescent in fruit and enlarging to 3.9–5.2 mm long, 2.8–3.6 mm wide, apex rounded, stellate-tomentose on the outside and along the inner edges, inner surface otherwise glabrous; petals sometimes present, to 4.3 mm long, strap-like; ovary 3-lobed, stellate-tomentose, styles 3, filiform, 3.2–3.9 mm long, twice bifid, rusty-brown, with numerous stellate trichomes. Capsule ca. 6.5 mm long, ca. 8 mm in diameter (estimates only; fruits had already begun to dehisce), depressed-globose; columella 5–5.5 mm long. Seeds 5.2–5.7 mm long, 3.8–4.2 mm wide, oblong in dorsal view, dorsal-ventrally flattened, rounded at the base, rounded and with a minute nipplelike projection at the apex, microscopically rugulose, shiny; caruncle 0.8–1.0 mm long, 1.6–2.1 mm wide, tan and thin.

Additional Specimen Examined. **Mexico**. Michoacán: Mpio. Angamacutiro, vertiente S del Cerro Tres Reyes, cerca de Angamacutiro, *Rzedowski 52696* (IEB).

The epithet *atrostellatus* refers to the black stellate trichomes that are scattered throughout the plant. I am unaware of this feature in any other Mexican species of *Croton*, and its occurrence serves to separate this taxon from all others in western Mexico. Some areas of the plant actually appear to the naked eye to be infested by a rust, but it is in fact a proliferation of these black trichomes that causes this illusion. According to the infrageneric circumscription of Webster (1993), the presence of valvate-reduplicate pistillate sepals, eglandular stipules and sepals, and a stellate pubescence warrants the placement of *Croton atrostellatus* in section *Lasiogyne* (Klotzsch) Baill. No other members of this section are known from western tropical Mexico (Webster 2001), and the only representative given for Mexico by Webster in his 1993 conspectus is *C. tabascensis* Lundell. Apart from lacking the characteristic black trichomes, *C. tabascensis* differs in having hispid young stems, leaves that are not bicolored and only moderately stellate-pubescent beneath, and sepals that are uniformly pubescent on the inner surface. Also, although supposedly not characteristic of the section *Lasiogyne*, in *C. tabascensis* the sepals of the pistillate flowers possess small, sessile glands. *Croton atrostellatus* is known from only two collections in the subtropical scrub of the Bajío region in northwestern Michoacán at elevations from 1800 to 1900 m. At the type locality it grows sympatrically with *C. adspersus* Benth. and *C. sphaerocarpus* H. B. K. It was collected with flowers in June and with fruits in October.

**Euphorbia calderoniae** V. W. Steinmann, sp. nov.—Type: Mexico. Michoacán: Mpio. Cuanajo, Cerro del Burro, pastizal, ladera de cerro, potrero, 2500 m, 3 Dec 1985, *J. M. Escobedo 756* (holotype: IEB!; isotype: MICH!).

Herba annua, prostrata; caules usque ad 20 cm longi, supra pilosi vel puberuli, infra glabri, teretes; folia opposita, petioli 0.3–0.5 mm longi, laminae obovatae vel oblongae, 0.3–0.6 cm longae, 0.2–0.4 cm latae, basi asymmetricae, rotundatae vel hemicordatae, apice obtusae, margo integer vel serrulatus; cyathia solitaria, pedunculi 0.3–1.2 mm longi, glabri; involucra infundibularia vel fere cylindrica, 0.7–0.9 mm longa, 0.6–0.7 mm lata, interne pubescentia, glandulae 4, circulares vel ovales, ca. 0.1 mm longae et latae, appendices ut videtur absentes vel angustae, 0.1 mm longae, 0.2 mm latae, flores staminati 5–8; ovarium trilobatum, subglobosum vel ovoideum, glabrum, styli 3, liberi, 0.3–0.4 mm longi, bipartiti; capsula trilobata, subglobosa vel ovoidea, 1.3–1.4 mm longa, 1.5–1.6 mm lata; semina triangula, ovoidea, 0.8–0.9 mm longa, 0.6–0.7 mm lata.

Prostrate annual from a slender, brown, vertical taproot; stems few to many arising from near the base, to 20 cm long, generally mat-forming and extending radially, diffuse to compact, moderately to highly branched, internodes 0.5–2 cm long, terete, pilose to strigulose or puberulent, pubescent only on the exposed surfaces, glabrous on the portions facing the ground, hairs crisped to recurved or rarely almost straight, 0.1–0.4 mm long, white to purple-tinged. Leaves opposite; stipules of all parts of the stems similar, 0.2–0.5 mm long, divided into subulate divisions or represented by a small, triangular laciniately margined scale; petioles 0.3–0.5 mm long, glabrous or sparsely pilose with spreading white hairs to 0.7 mm long; blades 0.3–0.6 cm long, 0.2–0.4 cm wide, obovate to oblong, with a prominent midvein but the lateral veins inconspicuous, glabrous to sparsely pilose, base asymmetrical, rounded to slightly hemicordate, apex rounded at maturity although frequently acute when young, margin serrulate at least towards the tip but usually entire along the distal 1/2–1/3. Cyathia solitary in the distal nodes, peduncles 0.3–1.2 mm long, glabrous. Involucre 0.7–0.9 mm long, 0.6–0.7 mm wide below the glands, infundibuliform to nearly cylindrical, outer surface glabrous, inner surface pilose below the rim; lobes subulate, 0.1–0.3 mm long, sometimes divided, sinus shallow and inconspicuous; glands 4, ca. 0.1 mm long and wide, circular to oval, appendages absent or represented by a narrow rim ca. 0.1 mm long and 0.2 mm wide, glabrous, entire to wavy or bilobed, white to reddish. Staminate flowers 5–8, bracteoles few, filiform. Gynophore glabrous, exserted 0.9–1.7 mm, ovary 3-lobed, subglobose to ovoid, glabrous, styles 3, free, 0.3–0.4 mm long, biparted to nearly the base, divisions filiform. Capsule 1.3–1.4 mm long, 1.5–1.6 mm in diameter, strongly 3-lobed, subglobose to broadly ovoid, columella 0.9–1.0 mm long. Seeds 0.8–0.9 mm long, 0.6–0.7 mm wide, triangular in cross section, the ventral faces collectively forming a single face, ovoid in dorsal view, blackish to blackish gray, micropapilliate, apex bluntly pointed, base rounded, dorsal keel prominent, blunt, uninterrupted, dorsal faces mostly plane, 0.6 mm tall, smooth; caruncle absent.

Additional Specimens Examined. **Mexico**. Michoacán: Mpio. Quiroga, Cerro del Tzirate, *López 874a* (IEB); Mpio. Zinapécuaro, 5 km al SSE de Jeráhuaro, *Rzedowski 46145* (IEB); Mpio. Uruapan, 5 km al S de Angahuan, en el Llano Chorítiro, *Soto Núñez 13882* (MEXU).

The specific epithet *calderoniae* pays tribute to Graciela Calderón de Rzedowski, a researcher at the Instituto de Ecología-Centro Regional del Bajío and specialist of Mexican plants. She is coeditor of the *Flora del Bajío y de Regiones Adyacentes*, and all but one of the known collections of *Euphorbia calderoniae* occur within the boundaries of this Flora. *Euphorbia calderoniae* is a member of subg. *Chamaesyce*, and like so many other species of the subgenus, the seeds serve to distinguish it. In habit it resembles a prostrate and diminutive form of *Euphorbia nutans* Lag. and apparently is related to this species; however, from this and close allies it is separated by the possession of seeds with plane and smooth dorsal faces. In related species the dorsal faces are convex and variously sculptured. In addition, the ventral two faces of *E. calderoniae* form a single flat surface, whereas in related species the ventral two faces usually form a convex surface. The leaves of *E. calderoniae* are reminiscent of those of *E. serpyllifolia* Pers. in both shape and in being mostly entire along the proximal margin and only serrulate towards the apex; in addition to seed characters, the pubescent stems readily serve to distinguish *E. calderoniae* from this species. The four known localities of *E. calderoniae* are in the trans-volcanic region of northern Michoacán, where it is found in grasslands, humid canyons in pine-oak forest, and scrub vegetation at elevations from 2300 to 2500 m. Flowering and fruiting overlap broadly, and fertile material has been collected in August and December.

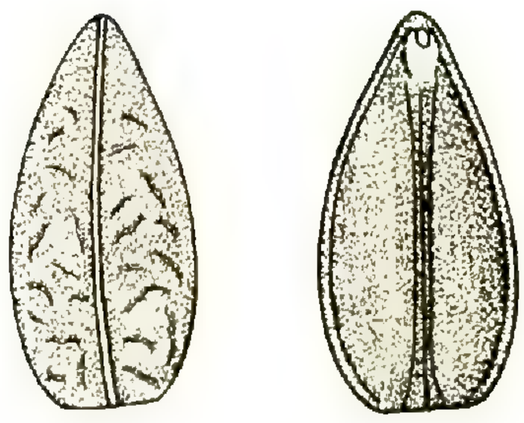
**Euphorbia infernidialis** V. W. Steinmann, sp. nov.—TYPE: MEXICO. Michoacán: Mpio. La Huacana, along MEX 37, ca. 1 km N of Los Ranchos, 18°44'N, 101°00'45"W, ± 200 m, 9 May 2002, *V. W. Steinmann, G. Puime & B. Vrskovy 2458* (holotype: IEB!). Fig. 2.

Herba perennis, prostrata vel ascendens; caules usque ad 25 cm longi, pilosi, teretes; folia opposita, petioli 0.3–0.8 mm longi, laminae variabiles, plerumque oblongae, 0.3–0.5 cm longae, 0.25–0.35 cm latae, basi asymmetricae et hemicordatae, apice obtusae, margo integer vel leviter serrulatus; cyathia solitaria, pedunculi 1.8–3.3 mm longi; involucra campanulata, 1.2–1.7 mm longa, 1.1–1.6 mm lata, pilosa, glandulae 4, ovales, 0.2–0.4 mm longae (radialiter), 0.4–0.7 mm latae (tangentialiter), appendices semicirculares vel flabellatae, 0.4–0.7 mm longae, 0.7–1.1 mm latae; flores staminati ca. 25–35; ovarium trilobatum, ovoideum, versus basim et secus carinas pilosum, styli 3, liberi, 0.3–0.4 mm longi, bipartiti; capsula trilobata, ovoidea, 1.5–1.9 mm longa, 1.4–1.8 mm lata, versus basim et secus carinas pilosa; semina quadrangula, elliptico-ovoidea, 1.1–1.6 mm longa, 0.6–0.8 mm lata.

Prostrate to ascending perennial herb from a brown, thickened, and woody tap root; stems numerous arising from near the base, to 25 cm long, internodes to 1.5 cm long, terete, uniformly pubescent around the entire circumference; stems, leaves, peduncles, and involucres shortly pilose with stiff to slightly curved white hairs 0.1–0.2 (–0.3) mm long. Leaves opposite; stipules dimorphic, those of the exposed surfaces of the stem remarkably reduced, inconspicuous, narrowly triangular to subulate, 0.1–0.2 mm long or apparently absent, those facing the ground mostly united into a broadly triangular scale 0.3–0.5 mm long with a laciniate-erose margin; petioles 0.3–0.8 mm long; blades 0.3–0.5 cm long, 0.25–0.35 cm wide, generally oblong but varying to ovate, obovate or orbicular, base asymmetrical and hemicordate, apex rounded, margin entire to faintly serrulate. Cyathia solitary at the distal nodes, peduncles 1.8–3.3 mm long. Involucre 1.2–1.7 mm long, 1.1–1.6 mm wide below the glands, campanulate, inner and outer surfaces pilose, lobes ca. 0.2 mm long, triangular, sinus shallowly U-shaped, extending ca. 1/5 the involucre, glands 0.2–0.4 mm long (radially), 0.4–0.7 mm wide (tangentially), oval, appendages 0.4–0.7 mm long, 0.7–1.1 mm wide, semicircular to flabellate, glabrous or puberulent on the back, entire to shallowly wavy, white fading pink. Staminate flowers ca. 25–35, bracteoles numerous, divided and pilose towards the tip. Gynophore glabrous, exserted 1.3–3.2 mm, ovary conspicuously 3-lobed, ovoid, stiffly pilose with hairs concentrated towards the base and along the keels; styles 3, free, 0.3–0.4 mm long, biparted from 2/3 their length to nearly the base, divisions clavate. Capsule 1.5–1.9 mm long, 1.4–1.8 mm in diameter, strongly 3-lobed, ovoid, broadest towards the base, stiffly pilose with straight, white, erect hairs 0.1–0.2 mm long, these concentrated towards the base and along the keels. Seeds 1.1–1.6 mm long, 0.6–0.8 mm wide, quadrangular in cross section, narrowly elliptic-ovoid in dorsal view, base obliquely truncate, apex pointed, reddish-brown, with a prominent dorsal keel, dorsal faces 0.5–0.7 mm tall, lightly rippled, sometime with a low but conspicuous longitudinal ridge, nearly plane to slightly convex, ecarunculate.

ADDITIONAL SPECIMEN EXAMINED. **Mexico.** MICHOACÁN: Mpio. La Huacana, ca. 1 km W of Los Ranchos, along the dirt road leading to the Sierra Las Cruces, ca. 18°42'N, 102°01'30"W, *Steinmann 3194* (IEB).

The specific epithet refers to the Infiernillo region of southern Michoacán and Guerrero. This area is centered around the Presa Infiernillo, a man-made reservoir resulting from the damming of the Río Balsas just downstream from its confluence with



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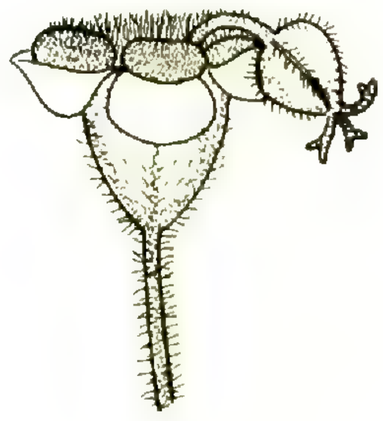

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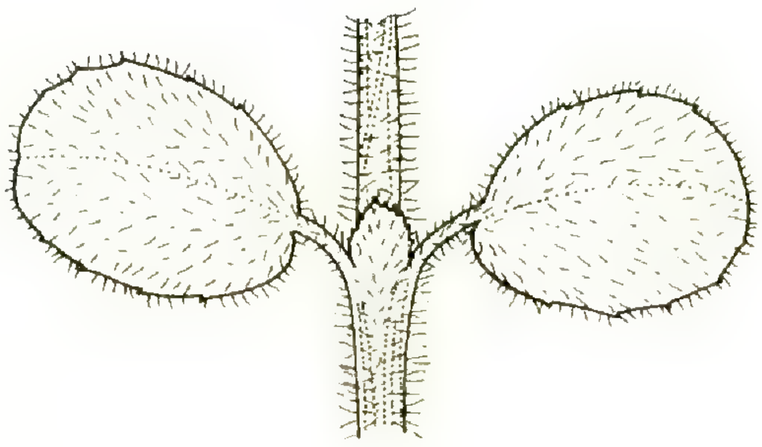

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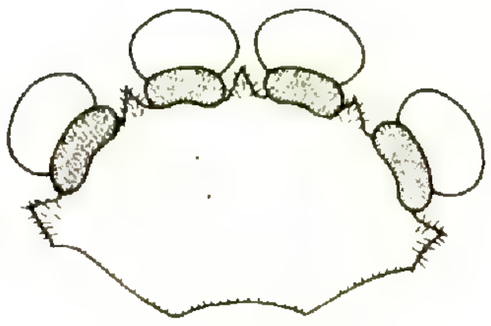

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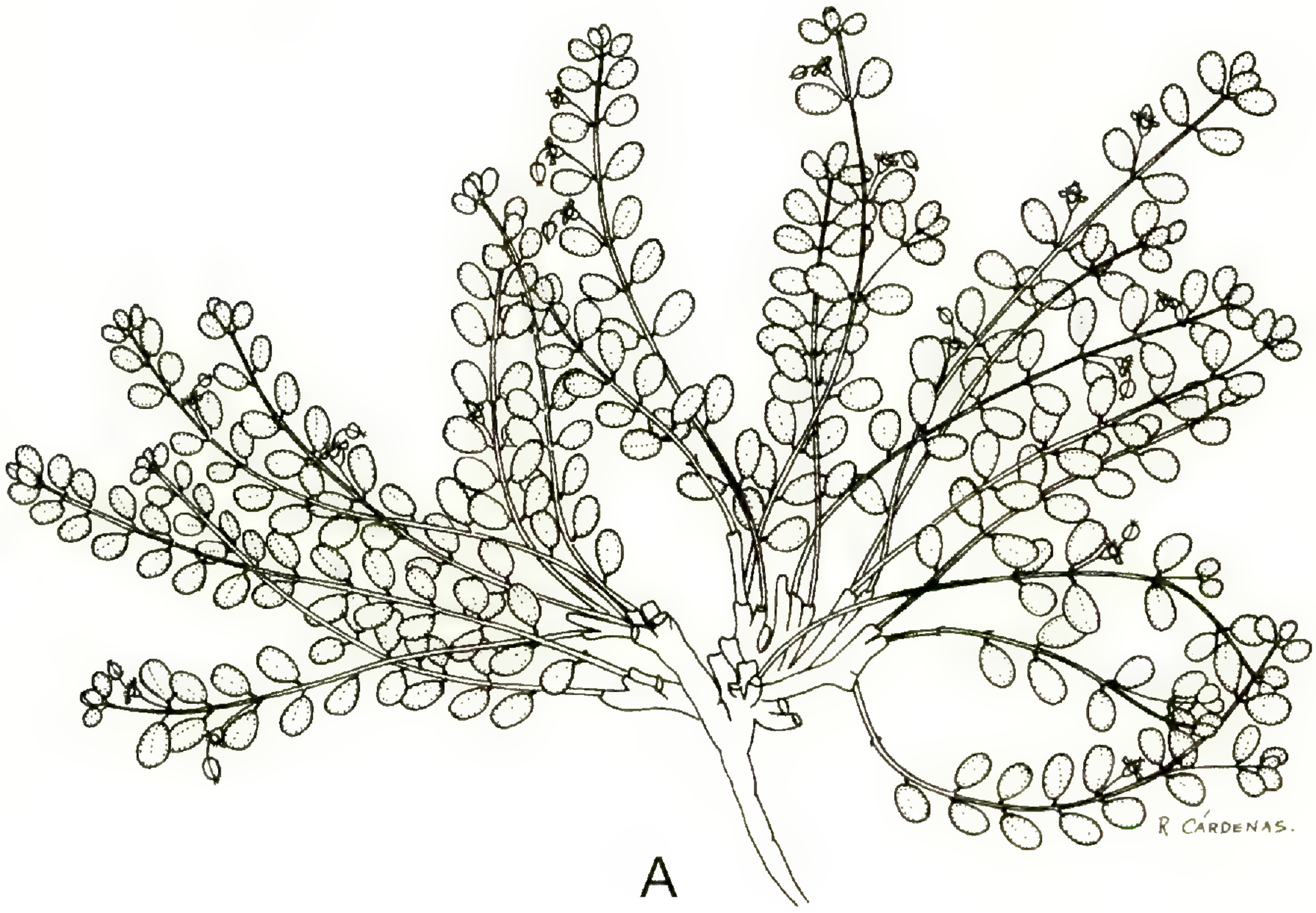


A

FIG. 2. *Euphorbia infernidialis*. A. Habit, ×1. B. Leaves showing united stipules of the underside of the stem, ×5. C. Cyathium, ×9. D. Involucre dissected, ×10. E. Seed, ventral and dorsal views, ×15.

the Río Tepalcatepec. The only known collections were made just a few kilometers inland from this body of water. *Euphorbia infernidialis* belongs to subg. *Chamaesyce*. The presence of ovaries with hairs restricted to the base and along the keels suggests a relationship with *E. leucantha* (Klotzsch & Garcke) Boiss. and *E. mendezii* Boiss., and both of these species occur in the vicinity. Yet, these species possess strongly dorsiventrally flattened stems with long spreading hairs along the margin, larger stipules, and cyathia in dense and congested lateral shoots of the primary stems. In contrast, *E. infernidialis* has terete stems without long spreading hairs, highly reduced stipules,

and cyathia borne solitary at the distal nodes of the primary stems. Oddly enough, the type collection was made from plants growing in the disturbed roadside directly adjacent to the highway and the only other known collection was made along the side of a dirt road. The adjacent vegetation in both of these areas is arid thorn forest. The only two collections were encountered in full flower during the height of the dry season (March to May), a time during which most members of subg. *Chamaesyce* are dormant. It has also been observed to flower during the summer rainy season.

**Euphorbia lottiae** V. W. Steinmann, sp. nov.—TYPE: MEXICO. Michoacán: Mpio. Arteaga, 30.5 km (by road) SSE of the junction with MEX 37 along the road to Infiernillo, 18°21'58"N, 101°54'09"W, ca. 300 m, 19 Oct 1996, *V. W. Steinmann & L. Varela E. 1104* (holotype: IEB!; isotypes: ARIZ! MEXU! MICH! NY! UCR!). Fig. 3.

Herba annua ephemera, prostrata vel decumbens; *Euphorbiae barnesii* affinis, a qua foliis basi subpeltatis, ramulis junioribus canaliculatis, pedunculis villosis, pedunculis et stylis longioribus differt.

Delicate, prostrate to decumbent ephemeral, almost turgescent and rather hydrophytic in character, from a slender taproot; stems numerous, prolifically sprawling, to 45 cm long, glabrous, the young ones upon drying usually caniculate with several sharp, whitish to translucent longitudinal ridges. Leaves alternate, well spaced on the stem; stipules inconspicuous and represented by minute, glanduliform protuberances 0.1 mm long; petioles 0.6–2.7 cm long, slender, usually longer than the blade, glabrous or sparsely villous with slender, wavy, white hairs 0.4–1.2 mm long; blade thin and membranaceous, that of the larger leaves 0.9–1.7 cm long, 0.8–1.8 cm wide, broadly ovate to sometimes orbicular, leaves near the branch tips with the blade smaller and generally ovate to elliptic, glabrate above, sparsely villous below with hairs like those of the petiole, rounded or bluntly pointed at the apex, continuous over the adaxial side of the petiole and thus appearing minutely subpeltate at the base, margin entire. Cyathia solitary at the nodes at the distal ends of the stems or on open and loose axillary branches; peduncle 2–9 mm long, slender to capillary, villous at least towards the base. Involucre 0.9–1.1 mm long, 0.7–1.1 mm wide below the glands, campanulate to infundibuliform, sparsely villous on the outer surface, shortly pilose towards the rim on the inner surface, lobes ca. 0.2 mm long, oblong to slightly obovate, fimbriate at the apex; glands 5, 0.1–0.15 mm long (radially), 0.3–0.4 mm wide (tangentially), narrowly oblong to reniform, light yellow becoming pinkish in age, appendages divided into 4–6 filiform segments 0.3–0.6 mm long, green to whitish. Staminate flowers ca. 20–25, bracteoles few, plumose towards the tips. Gynophore slender to capillary, extending to 4 mm long, glabrous, ovary subglobose to oblong, 3-lobed, glabrous; styles 3, 0.5–0.7 mm long, free, biparted to the base, divisions filiform. Capsule 3-lobed, 1.0–1.3 mm long, 1.2–1.4 mm in diameter, subglobose to ovoid or oblong, columella 1.0–1.2 mm long. Seeds 0.9–1.1 mm long, 0.6–0.7 mm in diameter, rounded in cross section, ovoid in dorsal view, light gray to tan, with numerous coarse tubercles interspersed with several mostly regular longitudinal rows of isodiametric depressions the bottoms of which contain a punctiform pit, ecarunculate.

ADDITIONAL SPECIMENS EXAMINED. **Mexico**. JALISCO: along road from Sierra de los Corrales, Mpio. Tecalitlán, to Tepalcatepec, Michoacán, *Dieterle 3049* (IEB, MICH), *Feddema 2230A* (MICH); Mpio. Tecalitlán, cerca de Gallardo, 10 km al NW de Tepalcatepec, Michoacán, *Rzedowski 17497* (ENCB, MICH).—MICHOACÁN: 11–13 km WSW of Apatzingán, along the road to Dos Aguas and Aguililla, *Dieterle 4308* (MICH); Mpio. Arteaga, 9 km al N de Infiernillo, 31 km al S de la carr. Arteaga–Nueva Italia, *Lott et*

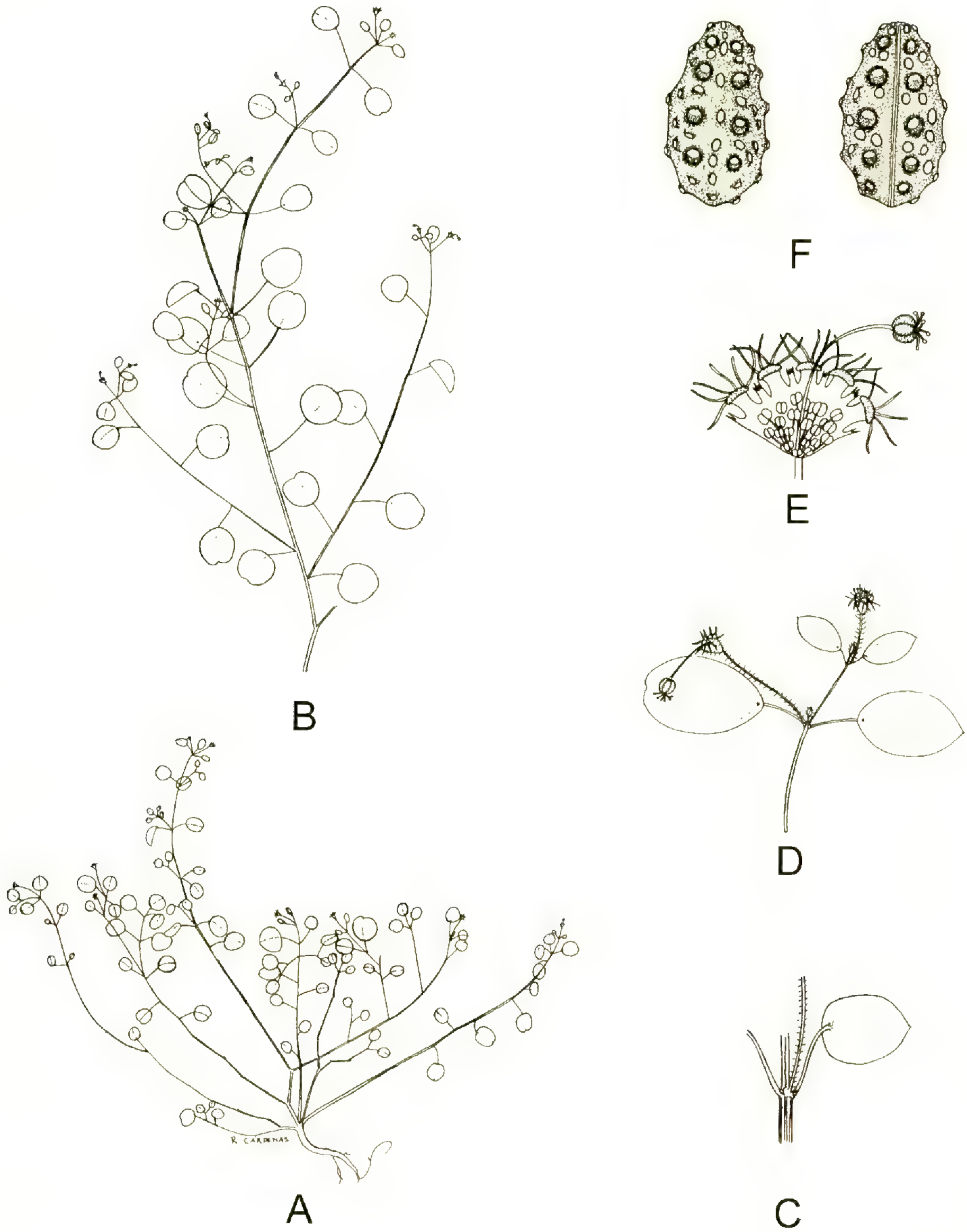


FIG. 3. *Euphorbia lottiae*. A. Habit, ×0.2. B. Flowering branch, ×0.4. C. Node showing minute glanduliform stipules (with leaf and portion of peduncle), ×2. D. Flowering tip of branch, ×2. E. Cyathium dissected, ×10. F. Seed, dorsal and ventral views, ×22.

*al. 2001* (MICH); Mpio. La Huacana, ca. 4 km (by road) SE of San Pedro Barajas, along MEX 37, base of cliffs on the hills W of El Limoncito, 18°46'N, 102°01'30"W, *Steinmann & Pérez 2729* (IEB).

This species is dedicated to Emily J. Lott, Euphorbiaceae enthusiast and a leading authority on the plants of the tropical deciduous forest of western Mexico. She collected the species at the type locality in 1983. *Euphorbia lottiae* belongs to subg. *Agaloma* and is a member of the *E. ocymoidea* L. complex. McVaugh (1993) provided a general overview of this group, recognizing three varieties of *Euphorbia ocymoidea*: var. *barnesii* (Millsp.) McVaugh, var. *ocymoidea*, and var. *subreniformis* (S. Watson) McVaugh. I agree with McVaugh concerning the taxa recognized as well

as the characters used to distinguish them; however, I differ with him in the belief that they are best treated as distinct species as opposed to infraspecific taxa. These, together with *Euphorbia lottiae*, probably form a monophyletic group and are indeed very similar, so their rank is somewhat arbitrary. I prefer to recognize them as species for various reasons. All are morphologically distinct from each other by more than a single character. There are ecological differences as well, with *E. lottiae* and *E. ocymoidea* growing at low elevations in tropical vegetation, *E. subreniformis* S. Watson occurring at higher elevations in mostly pine-oak forest, and *E. barnesii* (Millsp.) Oudejans occurring in both such habitats. Furthermore, their ranges are independent, and they maintain their distinctiveness even when growing in the same general area. In McVaugh's 1993 key, *Euphorbia lottiae* would come out to *E. barnesii*, and some specimens were initially identified as such. Although these two share consistently 5-glanded involucres, glabrous ovaries and capsules, slender to capillary gynophores, and eglandular branchlets, they differ in a number of features. The following couplet serves to distinguish them.

1. Young stems drying terete; long spreading hairs restricted to the outer surface of the involucre; base of the leaf blade attached to the adaxial side of the petiole and not continuous over it; peduncles 0.5–1 (–1.5) mm long, glabrous; styles 0.3–0.4 mm long. *E. barnesii*
1. Young stems, upon drying, usually caniculate with several sharp, whitish to translucent longitudinal ridges; long spreading hairs sometimes present on the stems and leaves in addition to the involucres; base of the leaf blade continuous over the adaxial side of the petiole and thus appearing minutely subpeltate; peduncles 2–9 mm long, villous at least towards the base; styles 0.5–0.7 mm long. *E. lottiae*

*Euphorbia lottiae* also appears to differ from the other species of the complex by its habit. It is almost turgescent and rather hydrophytic in character, whereas its close relatives possess more wiry and fibrous stems. As far as I can tell, the branches of the others are mostly erect to ascending. In contrast, the branches of *E. lottiae* are weak, primarily prostrate to decumbent, and prolifically sprawling. This species is known from a small number of collections gathered at four localities in the valley of the Río Tepalcatepec in southern Michoacán and adjacent Jalisco, where it occurs in thorn forest and tropical deciduous forest at elevations ranging from 300 to 500 m. It likely also grows in Guerrero; the type locality is only about 3 kilometers from the border and with vegetation similar to that of vast expanses in adjacent Guerrero. It thrives during the brief rainy season, but is one of the first plants to wilt and die as the rains diminish and the soil dries. All known collections were made from early September to late October.

**Jatropha jaimejimenezii** V. W. Steinmann, sp. nov.—TYPE: MEXICO. Michoacán: Mpio. Arteaga, along MEX 37, ca. 75 km (by road) N of Arteaga and 1 km S of El Descansadero, 18°38'41"N, 101°58'10"W, ± 300 m, shallow ravine on the rocky hillside above the highway, open thorn forest with columnar cacti, 3 Aug 2001, *V. W. Steinmann, E. Carranza & E. Pérez 1810* (holotype: IEB!; isotypes: ARIZ! MICH! DAV!). Fig. 4.

Frutex usque ad 2 (–3) m altus, monoecius; folia alterna, stipulae in lacinias glanduligeras dissectae, 1–2.5 mm longae, petioli 0.3–1.2 (–1.5) cm longi, laminae variabiles, plerumque oblongae, (0.7–) 1.0–3.8 cm longae, (0.6–) 0.8–3.6 cm latae, apice obtusae, basi obtusae vel truncatae, margo glanduloso-denticulatus; inflorescentiae cymosae, dichasiales, 1.5–4.5 cm longae, bracteae ellipticae vel spathulatae, 2–9 mm longae, 0.5–2.5 mm latae, pilosae, margo glanduloso-denticulatus; florum

staminatorum pedicelli graciles, 3.2–5.5 mm longi, pilosi, calyx imbricatus, lobi 5, ovati, oblongi vel elliptici, liberi, 3.2–5.5 mm longi, 0.9–2.3 mm lati, corolla imbricata, lobi 5, spathulati vel oblongi, basi connati, 5.4–6.2 mm longi, 1.7–2.2 mm lati, apice reflexi, stamina 5, in columnam connata 3.8–5.2 mm longa, antherae oblongae, 1.1–1.4 mm longae; florum pistillatorum pedicelli 1.8–3.5 mm longi, villoso-pilosi, calyx imbricatus, lobi 5, plerumque obovati vel spathulati, accrescentes, 6.5–11.8 mm longi, 2.6–5.4 mm lati, corolla imbricata, lobi 5 (6), ovati, 5.3–6.0 mm longi, 2.0–2.5 mm lati, apice reflexi, ovarium triloculatum, oblongo-ovoideum, basi planum, glabrum, styli 3, filiformes, 3.1–4.3 mm longi; capsula oblongo-ovoidea, 0.9–1.2 cm longa, 0.7–0.8 cm lata, trilobata; semina oblonga, 6.5–7.3 mm longa, 3.9–4.4 mm lata, laevia, caruncula cuculliformis, 1.4–1.9 mm longa, 2.7–3.2 mm lata.

Shrubs to 2 (–3) m tall, multibranched from near the base and highly branched above, drought-deciduous, with copious reddish latex, monoecious; stems villous, the hairs nearly straight, 1.1–2.2 mm long, multicellular, white and sometimes purplish at the base, lower layer of shorter appressed to recurved hairs also present, branches soft-wooded and flexible, bark brown to reddish brown, slightly roughened and exfoliating in thin slivers. Leaves alternate, mostly congested on short, arrested shoots; stipules represented by irregularly multifid stipitate-glandular structures 1–2.5 mm long; petiole 0.3–1.2 (–1.5) cm long, with pubescence like that of the stem; blade (0.7–) 1.0–3.8 cm long, (0.6–) 0.8–3.6 cm wide, membranaceous, with basal attachment to the petiole, mostly oblong but varying from ovate to elliptic, rarely rotund or shallowly palmately 3-lobed, palmately 3-veined from the base with the midvein more prominent than the laterals, apex obtuse, base truncate to obtuse, hirsute to villous on both surfaces, margin minutely denticulate with teeth ending in stipitate glands 0.1–0.2 mm long, in age the glands sometime shed and the margin appearing entire. Inflorescences many-flowered dichasial cymes 1.5–4.5 cm long, entirely staminate or with pistillate flowers at the lower first and second nodes, pistillate flowers also sometimes solitary on the short shoots, axis with pubescence as on the stem but the hairs tending to be shorter, peduncle 0.4–2 cm long, bracts 2–9 mm long, 0.5–2.5 mm wide, narrowly elliptic to spathulate, thinly pilose, the margin as in the leaves. Staminate flowers on slender, pilose pedicels 3.2–5.5 mm long; calyx strongly imbricate, lobes 5, 3.2–5.5 mm long, 0.9–2.3 mm wide, ovate to oblong or elliptic, slightly unequal, free to the base, apex mostly obtuse, rarely acute, pilose to puberulent on the outside, mostly glabrous within, rarely ciliate with stipitate glands; corolla strongly imbricate, lobes 5, 5.4–6.2 mm long, 1.7–2.2 mm wide, broadly spathulate to oblong, united 1/5 to 1/4 their length, apex obtuse, glabrous to minutely puberulent, often puberulent-ciliate, red-pink, free portion strongly overlapping and appearing united towards the base but clearly separate above, tips reflexed at anthesis; disk glands 5, 0.6–1.1 mm long, separate, ± oblong, dark brown; stamens 5, united into a column 3.8–5.2 mm long, free for 0.3–0.8 mm, anthers 1.1–1.4 mm long, narrowly oblong, sometimes with a filiform appendage 0.5–1.7 mm long arising from between the anthers, outer whorl of stamens absent. Pistillate flowers on relatively stout, villous-pilose pedicels 1.8–3.5 mm long; calyx imbricate, lobes 5, strongly unequal, generally obovate to spathulate, rarely oblong or ovate, accrescent in fruit and expanding to 6.5–11.8 mm long, 2.6–5.4 mm wide, apex obtuse or acute, thinly pilose on both surfaces, stipitate-glandular along the margin; corolla strongly imbricate, lobes 5 (6), 5.3–6.0 mm long, 2.0–2.5 mm wide, ovate, united only at the extreme base, apex obtuse, thinly pilose on both surfaces, pilose- or puberulent-ciliate, pink, tips reflexed at anthesis, caducous and falling as a single unit, disk annular, undulate and shallowly lobed; ovary 3-locular, oblong-ovoid with a flat base, inconspicuously 3-angled, glabrous, styles 3, 3.1–4.3 mm long, filiform,

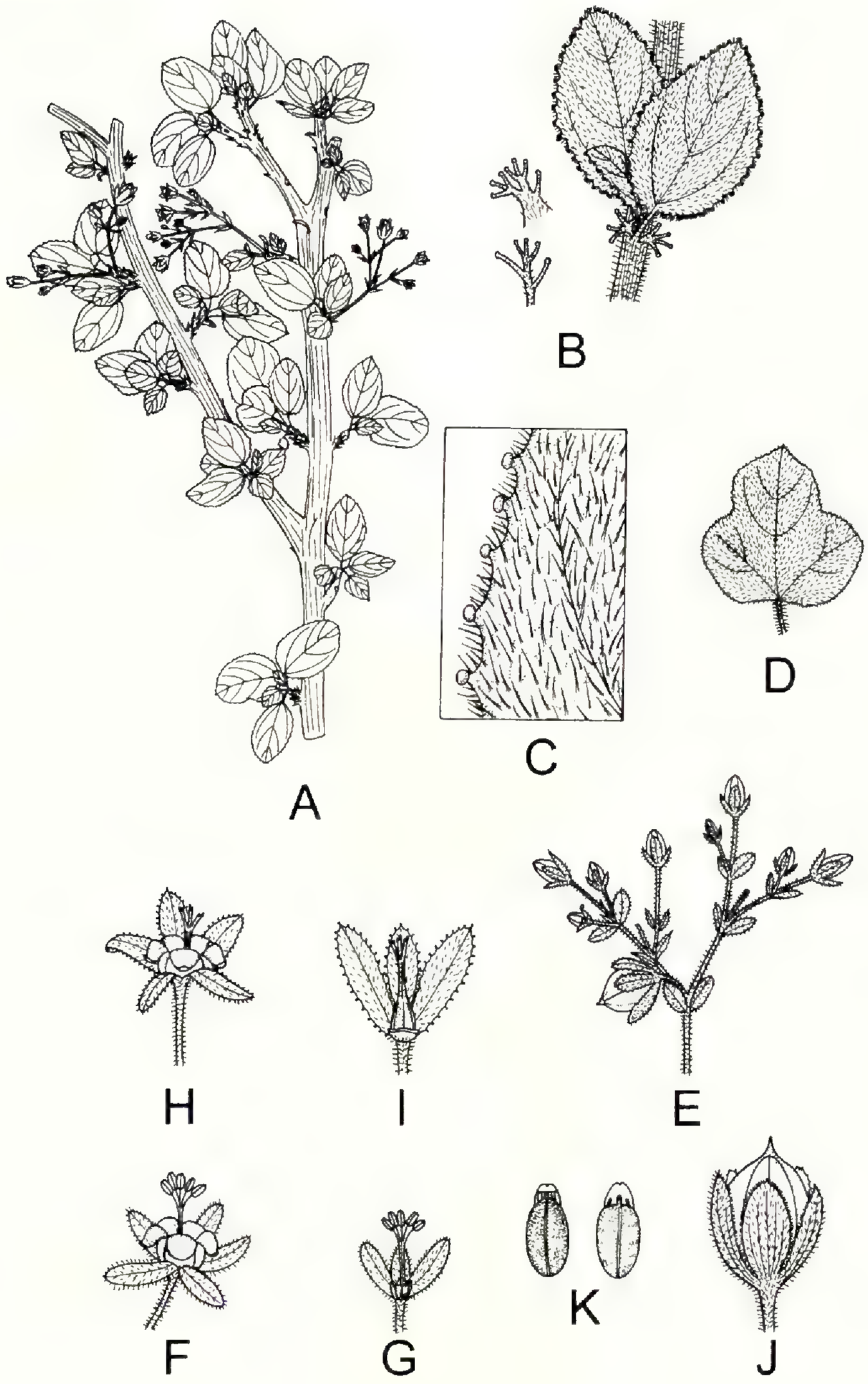


FIG. 4. *Jatropha jaimejimenezii*. A. Flowering branch, ×0.5. B. Node with leaves and stipules, ×1, and detail of two stipules. C. Leaf margin, ×5. D. 3-lobed leaf, ×0.4. E. Inflorescence, ×1. F. Staminate flower, ×1.3. G. Staminate flowers with petals and two sepals removed, ×1. H. Pistillate flower, ×1.5. I. Pistillate flowers with petals and two sepals removed, ×1.5. J. Capsule with accrescent sepals, ×1.2. K. Seed, dorsal and ventral views, ×1.2.

united into a slender column for 1/2–3/4 their length, stigma bifid and slightly dilated. Capsule 0.9–1.2 cm long, 0.7–0.8 cm in diameter, broadly oblong-ovoid, conspicuously 3-lobed in cross section, with a sharp, pointed beak resulting from the persistent base of the stylar column, generally 3-seeded although sometimes 2-seeded by abortion. Seeds 6.5–7.3 mm long, 3.9–4.4 mm wide, oblong in dorsal view, apex and base rounded, mottled light to dark brown, smooth, caruncle 1.4–1.9 mm long, 2.7–3.2 mm wide, hoodlike, mostly dark brown to nearly black.

ADDITIONAL SPECIMENS EXAMINED. **Mexico**. MICHOACÁN: Mpio. La Huacana, laderas al O de El Limoncito, 3.2 km al ESE de San Pedro Barajas, 18°46'53"N; 102°01'12"W, *Carrillo & Pérez 3188* (IEB); Mpio. Arteaga, along MEX 37, ca. 75 km (by road) N of Arteaga and 1 km S of El Descansadero, 18°38'41"N, 101°58'10"W, *Steinmann 1706* (IEB), *Steinmann & Steinmann 1654* (IEB), *Steinmann & Varela 1123* (IEB);

Mpio. La Huacana, 4 km (by road) SE of San Pedro Barajas, along MEX 37, hills W of El Limoncito, ca. 18°46'N, 102°01'30"W, *Steinmann, Lubinsky & Lubinsky 2692* (IEB).

This species is named for Jaime Jiménez Ramírez of the Facultad de Ciencias of the Universidad Nacional Autónoma de México. His many contributions on Euphorbiaceae and in particular *Jatropha*, including the descriptions of various new species, have greatly enhanced our understanding of the family in Mexico. The affinities of *Jatropha jaimejimenezii* are not obvious, and even its subgeneric placement is problematic. Following the classification of *Jatropha* proposed by Dehgan and Webster (1979), it belongs to subg. *Jatropha*. This is due to its monoecious sexuality, glandular-dissected stipules, and oblong seeds with a well-developed caruncle; however, I cannot further accommodate it within any of the sections. The most unusual feature of this species is the presence of only 5 monadelphous stamens with the second whorl of stamens completely absent. As far as I know this morphology is unique within the genus, and according to Dehgan and Webster (1979) all other species have 8 or 10 stamens, except for *J. podagrica* Hook. in which the stamens vary from 6 to 14. The two known stations of *J. jaimejimenezii* are within 20 km of each other in the Infiernillo region of southern Michoacán. The species occurs from 300 to 400 m elevation on rocky hillsides in relatively open thorn forest dominated by species of *Bursera*, *Croton*, *Krameria*, *Pseudosmodingium*, *Rahcoma*, and *Randia*, together with several columnar cacti and numerous leguminous shrubs and small trees. Flowering and fruiting overlap and occur during the rainy season from June to September.

**Manihot mcvaughii** V. W. Steinmann, sp. nov.—TYPE: MEXICO. Michoacán: Mpio. Arteaga, along MEX 37, ca. 75 km (by road) N of Arteaga and 1 km S of El Descansadero, 18°38'41"N, 101°58'10"W, ± 300 m, shallow ravine on the rocky hillside above the highway, open thorn forest with columnar cacti, 3 Aug 2001, *V. W. Steinmann, E. Carranza & E. Pérez 1811* (holotype: IEB!; isotypes: ARIZ! MICH! DAV!). Fig. 5.

Frutex usque ad 1.5 (–2.5) m altus, monoecius, glaber; folia alterna, decidua, stipulae glandulosae, 0.1–0.2 mm longae, petioli (0.5–) 0.9–2.4 mm longi, laminae 3–5-lobatae, 1.5–4.5 cm longae, 1.5–6.5 cm latae; flores solitarii vel binati; florum staminatorum pedicelli graciles, 0.7–2.4 cm longi, calyx campanulatus, 1–1.3 cm longus, 0.8–1.2 cm latus, sepala 5, basi connata, lobi ovati, 5.2–7.0 mm longi, 2.4–3.2 mm lati, stamina 8, filamenta filiformia, 6.5–7.5 mm longa, antherae anguste oblongae, 2.4–2.9 mm longae, 0.4–0.6 mm latae; florum pistillatorum pedicelli graciles, 0.5–1.1 cm longi, sepala 5, libera, anguste ovata, 8–12 mm longa, 2.5–3.2 mm lata, ovarium ellipsoideum, styli 3, 1.7–2.0 mm longi, capsula subglobosa, 0.9–1.0 cm diametro; semina elliptico-oblonga, 6.1–6.5 mm longa, 3.9–4.1 mm lata, complanata, caruncula 2.1–2.4 mm longa, 2.8–3.2 mm lata.

Dense, intricately branched shrubs to 1.5 (–2.5) m tall, glabrous throughout, drought-deciduous, with milky latex, monoecious; bark reddish brown, generally smooth and shiny. Leaves alternate, mostly well spaced on the stem, sometimes congested, stipules represented by minute, glandlike protuberances 0.1–0.2 mm long; petioles (0.5–) 0.9–2.4 mm long, slender; blade 1.5–4.5 cm long, 1.5–6.5 cm wide, membranaceous, with basal attachment to the petiole, deeply palmately 3–5-lobed, leaf venation camptodromous, central and adjacent lobes mostly obovate when young but becoming panduriform with development, 1.0–4.2 cm long, 0.8–2.9 cm wide, apex acute, central lobe only slightly larger than to nearly twice as long as the

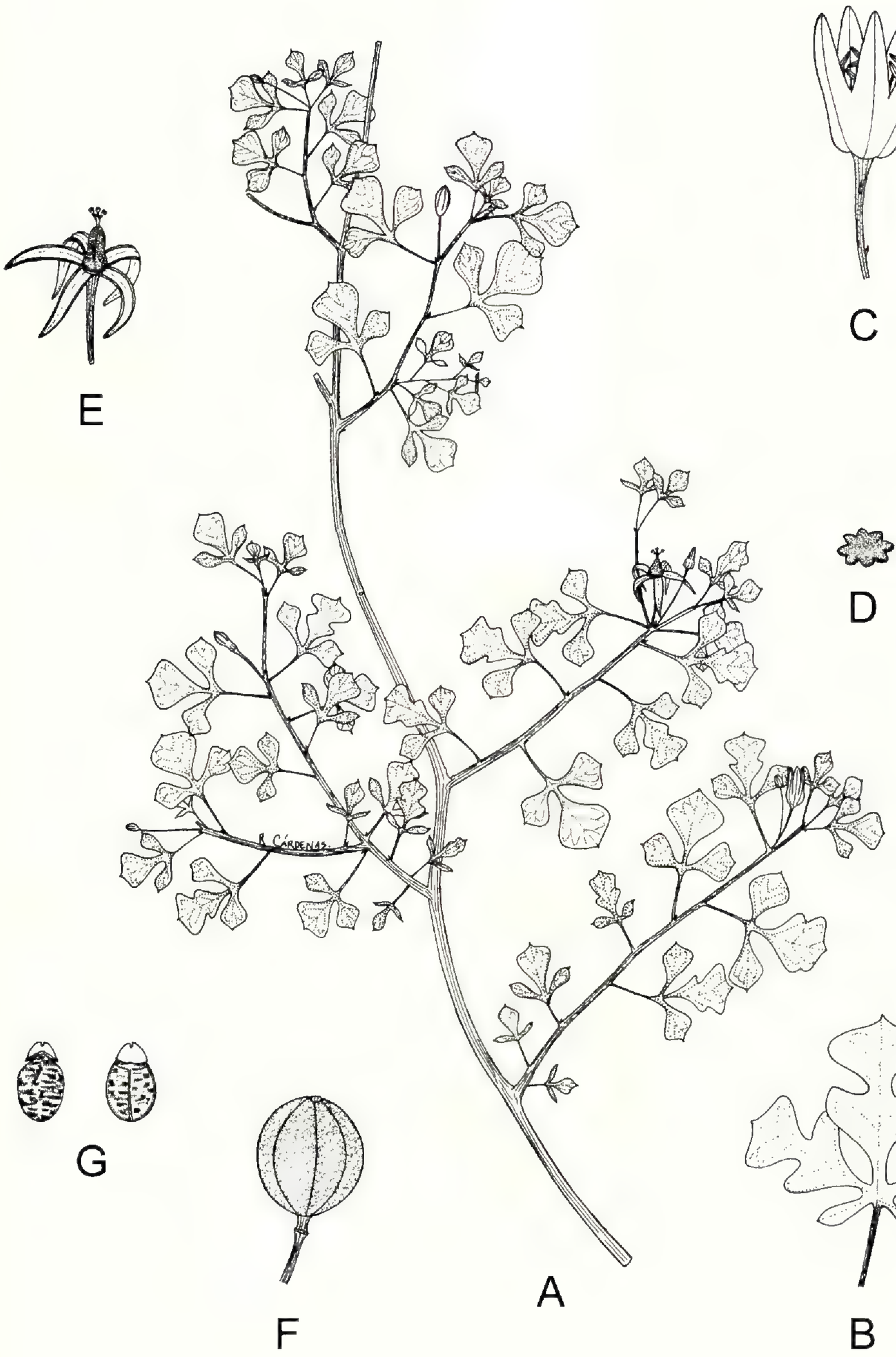


FIG. 5. *Manihot mcvaughii*. A. Flowering branch with young leaves, ×0.5. B. Mature leaf, ×0.6. C. Staminate flower, ×1.5. D. Staminate disk, ×2. E. Pistillate flower, ×1. F. Capsule, ×1.5. G. Seed, dorsal and ventral views, ×1.3.

adjacent lobes, apex of the secondary lobes rounded, basal lobes 0.4–1.2 cm long, 0.1–0.6 cm wide, spathulate to obovate or falcate, lacking on young leaves. Flowers solitary or in staminate-pistillate pairs (rarely in fasciculate groups of 3), borne near the branch tips. Staminate flowers on slender pedicels 0.7–2.4 cm long and with 3–9 minute, triangular-subulate bracteoles 0.2–0.3 mm long; calyx 1–1.3 cm long, 0.8–1.2 cm wide at the tip, campanulate, composed of 5 sepals united ca. 1/2 their length, the free lobes 5.2–7.0 mm long, 2.4–3.2 mm wide at the base, ovate, obtuse at the apex, yellow at maturity; disc 2.8–3.1 mm in diameter, flattened, conspicuously 8-lobed;

stamens 8, arising from between the lobes of the disc, filaments 6.5–7.5 mm long, filiform, anthers 2.4–2.9 mm long, 0.4–0.6 mm wide, versatile, narrowly oblong, rounded at the ends, opening by longitudinal slits. Pistillate flowers on slender pedicels 0.5–1.1 cm long, with 1 or 2 minute, triangular-subulate bracteoles 0.2–0.3 mm long; sepals 5, 8–12 mm long, 2.5–3.2 mm wide, free to the base, narrowly ovate, obtuse to subacute at the apex, yellow-green, sometimes reflexed at maturity; disc thick and fleshy, entire, ovary ellipsoid, without ribs; styles 3, 1.7–2.0 mm long, united ca. 1/2 their length, dilated into highly lobed, papillose stigmas at the tips. Capsule with both septicidal and loculicidal dehiscence, on a stout stipe 1–2 mm long, globose, 0.9–1.0 cm in diameter, without ribs, rounded at the apex, light green to yellow-green, with 7 or 8 dark green longitudinal lines, minutely and irregularly papillose. Seeds 6.1–6.5 mm long, 3.9–4.1 mm wide, elliptic-oblong in dorsal view, dorsiventrally flattened, rounded at the base, with a blunt point at the apex, smooth, grayish to light brown, mottled with irregular blackish markings, caruncle 2.1–2.4 mm long, 2.8–3.2 mm wide, fleshy, light yellow, frequently notched at the apex.

Additional Specimens Examined. **Mexico**. Michoacán: Mpio. Arteaga, along MEX 37, ca. 75 km (by road) N of Arteaga and 1 km S of El Descansadero, 18°38'41"N, 101°58'10"W, *Steinmann & Steinmann 1651* (DAV, IEB, MICH), *Steinmann & Varela 1122* (IEB); Mpio. La Huacana, 4 km (by road) SE of San Pedro Barajas, along MEX 37, base of cliffs on the hills W of El Limoncito, ca. 18°46'N, 102°01'30"W, *Steinmann & Pérez 2910* (IEB).

It is a pleasure to name this species after Rogers McVaugh, renowned botanist and expert on the flora of western Mexico. Its initial discovery is in fact due to him, as it was first encountered while in search of *Euphorbia arteagae* Buck & Huft around its type locality, a site visited by McVaugh in 1965. *Manihot mcvaughii* is noteworthy for its relatively small leaves and flowers, which are solitary or paired. In almost all other species of *Manihot* the flowers are arranged in well-differentiated racemes or panicles and the leaves are considerably larger. The only other species to possess such traits is *M. pauciflora* Brandegee of the Tehuacán-Cuicatlán valley of Puebla and Oaxaca. Rogers and Appan (1973) assigned *M. pauciflora* to a monotypic segregate genus, *Manihotoides* Rogers & Appan, but it appears to represent an arid-adapted species of *Manihot*, and most subsequent authors have treated the two names as synonyms (e.g., Webster 1994; Martínez et al. 2002). *Manihot mcvaughii* occurs in the most xeric region of the Balsas Depression; whether it is closely related to *M. pauciflora* or shares with it characteristics because of similar selective pressures remains to be determined. Interestingly, the only known localities of *M. mcvaughii* are the same three at which *Jatropha jaimejimenezii* occurs, and at all of these sites the two species grow side-by-side. The two species also share a similar period of reproduction, with flowering and fruiting during the rainy season from June to September.

## ACKNOWLEDGMENTS

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# GAZETTEER OF SOME POSSIBLY PUZZLING COLLECTING LOCALITIES FOR MICHIGAN PLANTS

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ABSTRACT. Listed alphabetically with county assignments are over 500 Michigan localities from which herbarium specimens have been seen but for which the labels lack county designations. Sites included usually (1) are not readily located in standard indexes to Michigan place names, (2) can be confused with other localities bearing the same names, and/or (3) have undergone a change in name. Documentation often cites published references, specific collectors, or dates.

## INTRODUCTION

This listing presents some ambiguous, controversial, or obscure Michigan localities, mostly from which actual herbarium specimens have been seen. It is intended largely to supplement (or in a few cases correct) entries in Romig's 1972 *Michigan Place Names* and the indexes prepared ca. 1917–1918 by Rand-McNally & Company for their indexed pocket map of Michigan and their much larger *Commercial Atlas of America*. (These two indexes are essentially identical.) My purpose is primarily to help users assign specimens to the correct county, since the county is widely used as the basic unit for filing records and mapping distributions. Often, however, more detailed information can be provided to enable a narrower designation of sites. Sometimes the same person collected at more than one site bearing identical names. Sometimes different collectors gathered specimens at sites with the same names. When I have been able to clarify such situations, clues appear here, in hopes that persons mapping distributions may avoid jumping to erroneous conclusions.

For 50 years I have been gathering this information, as the necessity was presented periodically to determine the localities (especially counties) where herbarium specimens—mostly older ones—with very scant data had been gathered. Others have often asked for help with fragmentary localities in (or thought to be in) Michigan, and it would appear useful to make this eclectic catalog more widely available despite the varying and inconsistent level of detail (and of citation) as items accumulated over the years without any intention of eventual publication.

If your favorite obscure site is not included here, that may not be an oversight. Remember that this list consists primarily of places (1) where plant collectors actually gathered specimens but generally failed to indicate the county; and/or (2) names that are repeated and often better known elsewhere in the state (sometimes even in the same county). Changes of place names and difficulty of locating sites on county maps are other criteria for listing.

## COLLECTORS CITED

Sometimes a collector's occasional label has an indication of county when other labels do not. Sometimes a particular collector (with year or date) needs to be cited to clarify a locality or the collector(s) who visited it. Initials as listed below indicate

the more frequently cited of these persons (as well as authors). More information about those who flourished in the 19th century—and where their collections may be found—is in Voss (1978). Other indications rarely given in capitals after citation of specimens or other data are the internationally recognized symbols for herbaria where specimens are found (more often given here for out-of-state institutions), e.g., MO = Missouri Botanical Garden; GH = Gray Herbarium of Harvard University; BLH = Cranbrook Institute of Science; MSC = Michigan State University. Names of species and dates of collecting at a site are intended only as examples and are not necessarily exhaustive. The field notes, rough and crude though they are, of Oliver A. Farwell have sometimes been very helpful (they are now housed in the University of Michigan Herbarium).

CWB = Clayton W. Bazuin (1893–1968)
WJB = William J. Beal (1833–1924)
EAB = Ernst A. Bessey (1877–1957)
CB = Cecil Billington (1876–1950)
EJC = Emma J. Cole (1845–1910)
DC = Dennis Cooley (1787–1860)
HTD = Henry T. Darlington (1875–1964)
CAD = Charles A. Davis (1861–1916)
CKD = Charles K. Dodge (1844–1918)
CWF = Charles W. Fallass (1854–1942)
OAF = Oliver A. Farwell (1867–1944)
CRH = Clarence R. Hanes (1874–1956)
FJH = Frederick J. Hermann (1906–1987)
EJH = Ellsworth J. Hill (1833–1917)
CFW = Charles F. Wheeler (1842–1910)

UMBS = University of Michigan Biological Station (meaning any of numerous collectors who used local names for area sites, most of which are in Nelson 1956)
First Survey = First Geological Survey of Michigan (cf. McVaugh 1970)

## OTHER SOURCES

Published and unpublished sources for information about a site (its location and/or history) are very incomplete in this list, but some are indicated as follows when they may be helpful in interpreting sites. Citing of illustrative specimen labels is especially frequent for monocots, the first group to be written up for *Michigan Flora*, as I usually did not bother to record additional supporting citations. Years of collections are generally preceded by "in"; years of publication or other sources of information are not. For obscure localities not included here, one should try consulting appropriate published works, such as those listed below and/or papers and published reports by the collector in question, for example, Cole (1901), Walpole (1924), Hanes (1947). The Haneses' 1947 *Flora of Kalamazoo County, Michigan* often includes clues in text or introduction concerning their collecting sites, so only a few troublesome ones are included here. Sometimes collectors provide a clue in their numbers, such as prefixing them with codes; e.g., for collections from counties other than Kalamazoo, Mr. Hanes often preceded a collection-number with an indication of the county, such as V.B. for Van Buren Co. or S.J. for St. Joseph Co. [An assistant recording data for me many years ago, upon seeing a label reading "C. R. Hanes S.J. 171" declared "I didn't know that Mr. Hanes was a Jesuit!" There is no end to the confusion that unusual or cryptic label styles can induce.]

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Section numbers interpreted in certain townships for collections of Dennis Cooley are in brackets if they come from later printed plat maps rather than from some contemporaneous label of his. (Facsimile reprints of 1859 and 1875 Macomb Co. plats, with detailed indexes, were published in 1983 under the sponsorship of the St. Clair Shores Historical Commission.)

## ADVICE

Many place names (not only of lakes) are duplicated within the state and one should never assume that all collections by all collectors from a place bearing a name listed below are necessarily from the same site. It should also be noted that many 19th century collectors used the name of an organized township without specifying "township" and did not necessarily mean a community of the same name within that township or elsewhere, e.g., Washington or Shelby [townships] in Macomb County and Paris [township] in Kent County. Sometimes a collector's name can be confused with a locality. Douglass Houghton, Michigan's first State Geologist (appointed in 1837), traveled over much more of Michigan than most of his contemporaries and furthermore was a good botanist (a former student of Amos Eaton). A collection sent out by him on exchange or for identification might have been labeled by the recipient merely (without date) "Houghton" and could now be misinterpreted as having come from the city or county of Houghton, later named for him.

Another caution that cannot be repeated too often is to distinguish between a collecting locality and the collector's address. C. K. Dodge almost invariably accompanied his name with "Port Huron, Michigan," which is where he lived, not necessarily where the specimen came from. In fact, a collection from "near Port Huron" might have come from the other side of the river, in Canada, where he also collected

extensively. Such "near" localities may often mislead, for "near" is a vague term and another county or even country could be involved. Furthermore, some 19th century collectors had their home town (e.g., "Ann Arbor") printed at the bottom of their blank labels no matter where the specimens were obtained. Many erroneous citations in the literature result from such deplorable labels.

## GAZETTEER, WITH REMARKS
(County name in capitals and brackets)

### A

Adams tamarack [MACOMB]: Shelby [Tp.] (cf. DC labels for *Malaxis monophylla, Carex brunnescens, C. canescens, C. trisperma*).

Adams, G., tamarack swamp [MACOMB]: Shelby [Tp.] (cf. DC 1842 label for *Carex disperma*).

Adams, Geo., meadow [MACOMB]: Shelby [Tp.] (cf. DC 1845–1846 labels for *Carex alopecoidea* and *Poa palustris*).

Adams, John [MACOMB]: ca. 1 mi N of Disco, Shelby Tp.

Agricultural College [INGHAM]: often abbreviated "Agrl. Coll." and in other ways, including "M. A. C." It was founded in 1855, became Michigan State College in 1925, and Michigan State University in 1955; the name of the community officially became East Lansing in 1907. Consider also College Woods, College Farm, etc.; and see also entries for Chandler's Marsh, Michigan State Col., and Towar's Swamp below.

Alger's Camp [ALCONA]: a "short distance west from Mud Lake" (q.v.) [= Barton City] (CFW et al. in 1888; cf. Voss & Crow 1976, p. 30).

Allen's Pinery [KENT]: = East St. Pinery in Grand Rapids (cf. EJC label for *Monotropa hypopithys*).

Alverno [CHEBOYGAN]: located on the Black River, not the Cheboygan R. as stated by Romig.

Anderson's Pond [KEWEENAW]: (OAF 1943).

Andrews Lake [presumably OAKLAND]: OAF collected on the same dates in Waterford Tp., Pontiac, and Bloomfield, all in Oakland Co.—but this lake is not on any map I have located; he cited the lake without county in Am. Midl. Nat. 9: 261. 1925.

Andrews [MACOMB]: H. Andrews property in Shelby [Tp., sec. 4] (cf. DC label for *Aster lanceolatus*).

Arethusa Bog [HOUGHTON]: 0.5 mile N of Laurium (cf. FJH label for *Carex flava*). [Note that S. H. Camp collected 1891–1893 at an Arethusa Swamp "near Clark's Lake" in Jackson Co.]

Armbruster's Woods [WASHTENAW]: Lodi Tp. (T3S, R5E), variously cited on labels as sec. 13 or NE¼ sec. 14.

Ashery brook [MACOMB]: Washington [Tp.] (cf. DC label for *Agrostis gigantea*).

Axford, J. S. [MACOMB]: Washington [Tp.] (cf. DC label for *Lithospermum caroliniense*).

Axford farm [OAKLAND]: Long John Axford farm, Oakland [Tp.] (cf. DC label for *Carex lasiocarpa*).

## B

Bailey Lake [KENT]: "4 miles east of Grand Rapids" (cf. CWB 1940 label for *Lysimachia terrestris*; his locality is in accord with the map in Cole 1901 although this lake is unnamed on the 1914 topo map for Grand Rapid quad.: NW¼ sec. 25, Grand Rapids Tp.; however, that lake is now shown as East Lake on maps.) [Other maps (both recent and 1918 topo for Lowell quad.) show Bailey Lake in sec. 19 of Vergennes Tp., mapped by EJC (1901) as Long Lake. Since Miss Cole had attended high school in Vergennes and later taught there for four years, the discrepancy is especially odd; Bailey School was across the road from the lake, which suggests some authenticity to the name in that tp.]

Lake Bailey [KEWEENAW]: ca. 2 miles E of Eagle Harbor (OAF 1943; probably a better known lake than any of the other half-dozen Bailey lakes in the state). [The 400-acre Lake Bailey Sanctuary of the Michigan Audubon Society is now in this area.]

Baldwin's [OAKLAND]: Oakland [Tp.] (cf. DC label for *Carex pseudocyperus*).

Bangham Rd. Woods [JACKSON]: sec. 3, T2S, R3W (E. A. Stowell in 1956–1960 et al., ALBC)).

Bardings [MONTMORENCY]: SW corner sec. 8, T30N, R1E (Case in 1956 etc.).

Barley Motors [KALAMAZOO]: sec. 4/5, Schoolcraft Tp. (CRH, cf. his labels for *Melampyrum lineare* and *Lysimachia lanceolata*).

Bassett's Island [GRAND TRAVERSE]: on NE side of Marion (Ford) Island (CFW in 1898).

Bates farm [MACOMB]: John Bates farm, Washington [Tp.] (cf. Cooley label for *Potamogeton gramineus*).

Bear Lake [MANISTEE]: EJH in 1880.

Bear Lake [VAN BUREN]: EJH in 1872 (= ?Great Bear in Bloomingdale Tp. or Little Bear [= Lake 14] in Columbia Tp.; cf. Voss in Michigan Bot. 6: 14. 1967).

Beaver Island: Besides the well-known island in Lake Michigan [Charlevoix Co.], note that this is also the old name for Manitou Island in Lake Superior off the tip of the Keweenaw Peninsula [Keweenaw Co.] (cf. Lt. James Allen's journal for June 15, 1832 [Mason 1958, p. 175]). There are yet other Beaver Islands in Minnesota: in Lake Superior (Lake Co., a flora by Lakela in Bull. Torrey Bot. Club 75: 265–271. 1948) and in the Mississippi River at St. Cloud (cf. Minnesota Conservation Volunteer Sept.–Oct. 1976, p. 16).

Belle Isle [KEWEENAW]: this tiny island (with National Park campground) on the northwest side of Isle Royale was so-named in 1915 (Parratt & Welker), and formerly had a resort and post office. [It should not be confused with the much better-known and thoroughly developed Belle Isle (named in 1845) in the Detroit River (Wayne Co.); cf. Mich. History 87(6): 5–19, Nov.–Dec. 2003.]

Benedict Marsh [OAKLAND]: Oakland [Tp.] (cf. DC labels for *Carex buxbaumii* and *Hierochloë odorata*).

Bennett Brook [MACOMB]: SW 35, Washington [Tp.] (cf. DC label for *Callitriche verna*).

Besser Natural Area [PRESQUE ISLE]: in sec. 13 and 14, T33N, R8E at Bolton Pt.

Bessey Creek [CHEBOYGAN]: = Lancaster Creek of maps, flowing into the NW part of Douglas Lake (UMBS).

Big Traverse Bay [HOUGHTON]: (OAF 1943; cf. also Traverse Bay, below).

Birchwood [BERRIEN]: just SW of Warren Dunes (CKD collected here in 1917).

Black Pool (Meadow) [KEWEENAW]: (OAF 1943).

Black River [GOGEBIC]: this is the Black River of Henry Gillman in 1868, flowing into Lake Superior west of the Presque Isle River and Porcupine Mts. State Park (cf. Peters in Mich. Academician 18: 426. 1986). [There are several other Black Rivers in Michigan, e.g., in Alcona, Allegan, Muskegon (C. D. McLouth coll.), Ottawa (see below), St. Clair (C. K. Dodge coll.), Sanilac, and Van Buren counties. The Black River in Cheboygan Co. flows from Black Lake into the Cheboygan River near its mouth, but the name is also carelessly applied to the Upper Black River, which arises in Otsego Co. and flows through small portions of Montmorency and Presque Isle counties before finally entering Black Lake in Cheboygan Co.]

Black River [OTTAWA]: The river and the Black Lake into which it flows were changed to Macatawa River and Macatawa Lake in 1974 and 1935, respectively.

Blanchard Lake (or "Bog") [CHEBOYGAN]: = Mud Lake of maps in secs. 21 and 28, T38N, R3W (UMBS).

Blockhouse [OSCODA]: on Blockhouse Creek, NE¼ sec. 12, T26N, R4E (CFW et al. in 1888; cf. Voss & Crow 1976, p. 34).

Bloody Run [WAYNE]: Detroit, name changed from Parent's Creek after a bloody battle with Indians in 1763; south of what later became Jefferson Ave. (cf. Farmer, pp. 9–10).

Bodies Creek Meadow [KEWEENAW]: the creek flows into Eagle River at Phoenix (OAF 1943).

Bohemia, Mt. [KEWEENAW]: sec. 29, T58N, R29W.

Bois Blanc Island [MACKINAC]: CB collected here in 1914 and 1916 (cf. labels for *Taxus canadensis*, *Salix cordata*, etc.) as did others in other years, including S. H. Camp in the 1890s. CB also collected in 1914 at the island of the same name [also often corrupted to "BobLo"—to which it was officially changed in 1949] in the Detroit River, on the Canadian side of the International border and hence in Essex Co., Ontario (cf. his label for *Physalis longifolia* and also Farmer, pp. 7–8).

Bootjack [HOUGHTON]: sec. 20, T55N, R32W.

Botanical Gardens [WASHTENAW]: The University of Michigan Botanical Gardens have been located at three quite different sites (other than plots as early as 1897 on the central campus and rented greenhouse space in town). Originally (1907–1916) they were (in both geography and administration) associated with the Nichols Arboretum on Geddes Ave. in the NE part of Ann Arbor. From 1916

until 1960–1961 they were located south of Stadium Blvd. between Packard Rd. and South Industrial Highway, with the entrance on Iroquois St. Since completion of the move in 1961, the unit (now named the Matthaei Botanical Gardens) has been located on Dixboro Rd. in the NE part of Ann Arbor Tp. and W part of Superior Tp., south of Plymouth Rd.

Bowery Park [LAKE]: on Big Star Lake (CWB in 1947 etc.).

Brandt Woods [CALHOUN]: in sec. 7–8, T2S, R4W (Sheridan Tp.), N of Winnipeg Lake.

Bridge St. Ferry, West [OTTAWA]: west of Grand Rapids, sec. 20, Tallmadge Tp. (EJC).

Brigham Lake [CALHOUN]: in the Ott Preserve (q.v.); on county maps as Blackley Lake.

Brown Marsh [KALAMAZOO]: short distance S of Patton's marsh (q.v.) (CRH, cf. his *Flora* p. 159).

Brown tamarack [MACOMB]: Washington [Tp.] (cf. DC labels for *Carex hystericina* and *C. tenera*).

Brown's West Woods [KALAMAZOO]: E. L. Brown's, sec. 22, Prairie Ronde Tp. (CRH; E. L. Brown located in Schoolcraft, Hanes 1947, p. 224 under *Datura*).

Brown's [MACOMB]: Saul Brown's, Shelby [Tp., sec. 3] (cf. DC label for *Aster lanceolatus*).

Brownstown [WAYNE]: = Tp. (OAF in 1930).

Bryant's Bog [CHEBOYGAN]: very near Douglas Lake in sec. 29, T37N, R3W (UMBS).

Budrow's Marsh [KALAMAZOO]: sec. 4, Schoolcraft Tp. (CRH, cf. his 1934 label for *Quercus coccinea*; his *Flora* locates Budrow's farm (p. 253) as "east of Sugarloaf Lake"—which could conceivably be near the oak site).

Burlingham's field [MACOMB]: Washington [Tp.] (cf. 1852 DC label for *Salix bebbiana*).

Burton [presumably Tp., GENESEE]: (D. Clarke in 1866).

## C

C. & H. Stamp Mills [HOUGHTON]: on shore of Torch Lake at Lake Linden (OAF, many collections) (cf. Benedict, *Red Metal: The Calumet & Hecla Story*, pp. 116 and 188. 1952. [The C. & H. company was long the leading copper producer on Lake Superior. Cf. also Clifton, below.]

Cable Lake [CASS]: sec. 5, T5S, R16W [for no apparent reason the name has been dropped on some recent county maps].

Cady's Corner, etc. [WASHTENAW]: long a popular collecting area near the former general store at intersection of Platt Rd. and Michigan Ave. (i.e., near the NW corner of sec. 26, Pittsfield Tp. (T3S, R6E). [See also Thomas Bog/woods below. I am aware of no collections from Cady (or Cady's Corners) in sec. 30, Clinton Tp., Macomb Co., where there was a Post Office 1864–1906 (Romig).]

Camp 5 [MENOMINEE]: (cf. CAD 1905 label for *Physalis virginiana*).

Camp 6 [IRON]: 1.5 miles N of Mansfield (cf. Rep. Geol. Surv. Mich. for 1906, p. 30 and CAD 1905 label for *Cynoglossum boreale*).

Camp 7 [CHARLEVOIX]: 4.5 miles NW of Vanderbilt [which is in Otsego Co.] (EAB in 1912).

Camp 7 [MENOMINEE]: ca. 1 mile W of Faithorn, Menominee River (cf. Mich. Man. 1905, p. 162, Menominee River station on the Minneapolis, St. Paul, and Sault Ste. Marie RR, and CAD 1905 labels for *Agropyron smithii* and *Carex granularis*).

Camp 8 [CHARLEVOIX]: NW¼ sec. 19, T33N, R4W (EAB in 1912; cf. his labels for *Abies balsamea* and *Hackelia virginiana*).

Camp 9 [DICKINSON]: near Waucedah (CAD in 1905).

Camp Blodgett [OTTAWA]: sec. 28, Grand Haven Tp.

Camp meeting ground [MACOMB]: Bruce [Tp.] (cf. DC 1845 label for *Carex tenera*).

Campau Woods [WAYNE]: (pencil note in J. M. Sutton's hand on his label for *Asimina* and cf. also CB label for *Carya cordiformis*).

Camps [see Davis, Peter White, Roth, below]

Canal [HOUGHTON]: (OAF 1943).

Canfield's Farm [MANISTEE]: now within the southwestern city limits of Manistee; type locality for *Potamogeton hillii* (cf. Morong label, 14 Aug. 1882, NY, "pool on Canfield's farm, near Manistee"). [The property was acquired by the Manistee Country Club in the late 1880s and the two pools were drained (letter of Sept. 28, 1959, from C. N. Russell, president of Manistee County Historical Society, to EGV, quoted in Mich. Bot. 4: 13–14. 1965). Not the same as Canfield Lake, 3 miles to the southeast.]

Cannon's farm [MACOMB]: J. Cannon's, Washington [Tp.] (cf. DC 1850 label for *Agrostis gigantea*).

Caribou Island [KEWEENAW (Isle Royale)]: East and West Caribou Islands are immediately SW of Mott Island in the Isle Royale archipelago (only known site—which of the two was not stated—for *Antennaria rosea* in Michigan). [Should not be confused with the larger and more remote Caribou Island in eastern Lake Superior, Ontario, Canada.]

Carlton [MONROE]: = Carleton (cf. CFW label for *Uvularia sessilifolia*).

Carpenter's [MACOMB]: Simon Carpenter's meadow (cf. DC 1845 label for *Ranunculus acris* [no tp. indicated]).

Cascade Glen [WASHTENAW]: ravine S of Huron River near S edge sec. 17, T2S, R6E, north of Ann Arbor.

Cedar Creek Valley [KEWEENAW]: (OAF 1943).

Central House [BENZIE]: in Inland Tp. (CFW et al. in 1888; cf. Voss & Crow 1976, p. 64, note 89).

Central Mine [KEWEENAW]: in SE¼ sec. 23, T58N, R31W (J. W. Robbins in 1861 and 1863).

Chamberlain Mill [OAKLAND]: DC in 1839, probably SW¼ sec. 1, Addison Tp.—but marsh 1 mile E (cf. 1839 label for *Carex lacustris*) would be in Sec. 6, Bruce Tp., Macomb Co.).

Chamberlin Marsh [OAKLAND]: Addison [Tp.] (cf. DC label for *Carex tetanica* var. *meadii*).

Chandler's Marsh [CLINTON]: over 3000 acres once owned by Zachariah Chandler, U.S. Senator from Michigan (bought by him from the Agricultural College, *fide* Ceasar 1978 p. 27–28); the marsh mostly in Clinton Co., incl. all portions near the RR (cf. soils map), but the S part does extend into Ingham Co. (cf. 1933 soils map). Chandler Farm was "3 miles N of M.A.C." [Mich. Agric. College] (cf. CFW 1901 label for *Senecio pauperculus*; cf. also Mich. History 65(3): 10, May–June 1981, and esp. 82(6): 52–53, Nov.–Dec. 1998).

Christianna Lake [CASS]: (J. A. Nieuwland in 1924 etc.).

Clark Lake [JACKSON]: of the 15 Michigan lakes bearing this name, the one in Jackson Co. (Columbia Tp., P.O. as "Clarklake" 1896– ) is the type locality for *Betula ×purpusii* Schneider; however, Clark Lake in Livingston Co. = the "Mont Lake" (q.v.) of Mary Clark .

Clark Mine [KEWEENAW]: E½ sec. 4, T58N, R28W (OAF).

Clay Point [WAYNE]: island near mouth of Detroit River (B. E. Quick in 1913; cf. his letter to EGV, March 1957).

Clifton (or Cliff) [KEWEENAW]: village at the great Cliff Mine site, nearly 3 miles SW of Eagle River (with shafts in several sections, including sec. 36, T58N, R32W, and adjacent sec. 1, T57N). Oliver A. Farwell (father of the botanist) was agent in charge of the mine from 1871 (coming from the nearby Phoenix Mine) until his death in 1881. OAF the botanist collected extensively in the Cliff area. [It is no coincidence that Hervey Parke, who handled the business records for the Cliff Mine 1852–1863, was founder of the Parke, Davis firm, which employed the botanist Farwell from 1892 until his retirement in 1933.] The Cliff lands were purchased by Calumet & Hecla (q.v., as "C. & H.") in 1909. (For much information, cf. Chaput, *The Cliff: America's First Great Copper Mine*, p. 55. 1971.)

Clifton Marsh [MACOMB]: Washington [Tp.] (cf. DC labels for *Eleocharis rostellata, Poa languida, Carex buxbaumii*, etc.).

Clifton Mill Pond [MACOMB]: sec. 6, Washington Tp.

Coalpit Hill [CHIPPEWA]: Sault Ste. Marie [Zina Pitcher collected *Adenocaulon bicolor* here June 24, 1826, but his label [MICH] does not indicate whether it was from the U.S. or the Canadian side. R. D. Williams in 1905, *The Honorable Peter White*, p. 95 in chapter on "Sault Ste. Marie before the Canal," describing an 1847 incident, implied the U.S. side and referred to "outside of the Sault on Coalpit hill" where a traveler from Mackinaw to the Sault waited en route to James Schoolcraft's store in the fort. Bernard Arbic (pers. comm., 1995) notes that a letter from John Johnston in 1879 refers to a homestead "about three miles from the Sault & a mile and a quarter from the river on Coal Pit Hill, commanding the view of both channels .."; Dr. Arbic also notes that some old property deeds suggest that the site was south of the present campus of Lake Superior State University, on the east side of the Michigan Meridian.]

College [see Agricultural College]

Colon Junction [ST. JOSEPH]: = Fairfax, 2 miles W of Colon (CFW in 1890 and 1893), cf. label for *Carex bicknellii* [an 1889 map shows MCRR line to Lansing crossed here].

Comins [OSCODA]: Comins' farm (CFW et al. in 1888), on N side of Au Sable River west of Comins Creek, in sec. 11, T26N, R3E (cf. Voss & Crow 1976, p. 36, note 44); the later community of Comins is 10 miles to the north.

Connor Creek [WAYNE]: mouth is due N of N end of Belle Isle.

Conservation Park [GRATIOT]: S of Alma in sec. 4, T11N, R3W.

Cordell [CHIPPEWA]: 1 mile W of Spur 459 (q.v.).

Cornell's [SCHOOLCRAFT]: W. T. S. Cornell's farm near Hiawatha (cf. CKD label for *Polygonum persicaria*).

Cove, The [OAKLAND]: on Lakeville Lake (cf. CB in Pap. Mich. Acad. 11: 51–73. 1930).

Cranberry Marsh [KEWEENAW]: (OAF 1943).

Crisman's [MACOMB]: Jack Crisman's land, Washington [Tp., presumably sec. 22 or 27] (cf. DC 1840 label for *Aster lateriflorus*).

Crooked Pond [MACOMB]: Washington [Tp.] (probably = what now is Crooked Lake, in sec. 5—a natural lake with a dam, *fide* Humphrys; cf. DC 1843 label for *Carex viridula*).

## D

Davis, L. [probably MACOMB]: (DC in 1837, cf. label for *Rumex crispus*); later plats show property of many Davises in Macomb Co., including Washington Tp., but the earlier of them show no L. Davis.

Davis, Camp [CHEBOYGAN]: on S shore of South Fishtail Bay, Douglas Lake [Univ. of Michigan engineering camp established in 1909 and named for J. B. Davis in 1916; in 1929 the engineers (surveyors) moved to Wyoming and the Biological Station, established in 1909 immediately east of Camp Davis, moved to the site of the latter.]

Davis Lake [MONTCALM]: the pool in Vestaburg Bog (q.v.). [This is not any of the 12 Davis Lakes in Humphrys.]

Davis Woodlot [WASHTENAW]: Salem Tp., SE¼ sec. 16, T1S, R7E (cf. label for *Caulophyllum thalictroides*).

Dead Lake [WASHTENAW]: less than 1 mile SW of Whitmore Lake (OAF 1943).

Deer Lick [IONIA]: "2 mi. n.w. of Hubbardston Ionia Co." (CFW, cf. labels for *Scirpus olneyi* and *Eleocharis parvula*).

DeGroff meadow [MACOMB?]: (DC in 1853, *Elymus virginicus*); the DeGroff name is on old plat maps in Ray Tp. and Hezekiah DeGroff built a sawmill 2 ½ miles E of Davis [= Brooklyn] in Ray Tp. (cf. Eldredge, *Past & Present of Macomb County,* 1905)— but DC label offers no clue as to tp. or even county.

Detroit Island: [Door Co., Wisconsin, on the S side of Washington Island; not in Michigan, just as Detroit Lakes, Minnesota, have nothing to do with Detroit, Michigan.]

Detroit Zoo [OAKLAND]: sec. 21, T1N, R11E (ca. 2 miles SW of Royal Oak); *not* in Wayne Co., as labels are often misinterpreted because of the word "Detroit" (J. M. Sutton in 1916 (cf. his report in Rep. Mich. Acad. 19: 263–271. 1918).

Devil's Washtub [KEWEENAW]: SE¼ sec. 25, T59N, R29W (ca. 2 miles W of Copper Harbor).

Dewey's [OAKLAND]: Dewey's in Oakland [Tp.] (DC in 1847, *Polygonum amphibium*).

Douglas Farm [KENT]: Fallassburg (CWF in 1886, cf. label for *Arabis lyrata*).

Douglass Houghton [see Houghton].

Draper School [JACKSON]: SW corner sec. 29, Rives Tp. (Camp in 1893; cf. 1926 soils map).

Duck Lake [MUSKEGON]: at Michillinda (H. C. Cowles in 1906, cf. label for *Lemna minor*). [A State Park is now on the north side of this lake, with frontage also on Lake Michigan. There are about 30 other Duck Lakes in Michigan.]

Due West [OAKLAND]: an interurban station "near Rochester" (cf. OAF in Am. Midl. Nat. 11: 49 [1928], under *Carex richardsonii*).

Duns Scotus Coll. [OAKLAND]: Southfield.

Dutton's [CHEBOYGAN]: Topinabee (M. Freeman in 1888, cf. her label for *Monotropa uniflora*).

## E

Eagle Isle [CHARLEVOIX]: = Old Island in Round Lake, Charlevoix harbor (cf. letter from William Ratigan to EGV, Nov. 8, 1968). (J. A. Drushel et al. in 1914 and 1915, MO). [N.B.: there is also an Eagle Island in Walloon Lake.]

East Bluff [KEWEENAW]: in sec. 1, T58N, R28W and nearby (see also Vulcan, below).

East Lake [CHEBOYGAN]: = the eastern of Twin Lakes of maps, in sec. 7, T38N, R3W (UMBS).

East Point [CHEBOYGAN]: E side of Douglas Lake at beginning of North Fishtail Bay (UMBS).

Economou farm [ISABELLA]: sec. 31, T13N, R5W (cf. labels at ALMA).

Edgewater Park [ST. CLAIR]: at Algonac (OAF) .

Edgewood [GRAND TRAVERSE]: (CFW in 1898; just E of Traverse City).

Edgewood [HOUGHTON]: apparently at Lake Linden (OAF 1943; he collected at Edgewood several times in 1941 and 1942).

Edwards Prairie [CASS]: near Edwardsburgh (First Survey, Aug. 1838; cf. McVaugh 1970, p. 242).

8-mile Creek [GOGEBIC]: west side of Gogebic Lake (EAB in 1919); (cf. label for *Juncus dudleyi*).

Entry [HOUGHTON]: = Portage Entry (from Lake Superior to Portage River and Lake), near Jacobsville.

Esrey Park [KEWEENAW]: on Agate Harbor, ca. 5 miles E of Eagle Harbor.

Eureka [HOUGHTON]: near Laurium (FJH in 1922–1926).

Evergreen Cemetery [WAYNE]: in Detroit, on S edge of Woodlawn Cemetery (q.v.).

## F

Farwell, Mt. [KEWEENAW]: (OAF 1943).

Feeding Ground Lake [MARQUETTE]: SE¼ sec. 31, T45N, R25W. [There are also Big and Little Feeding Ground lakes in Ogemaw Co. (Locke in 1941).]

Felt-boot factory [KENT]: source of wool refuse used for fertilizer on the Phillips farm in sec. 19, Paris Tp., apparently introducing a number of species from the Southwest (cf. EJC 1901, p. 160 &, e.g., her labels for *Erigeron flagellaris, Verbesina encelioides, Chrysopsis villosa*, and also *Mich. Flora* 3: 380. 1996).

Fernwood [BERRIEN]: private nature center on E side of St. Joseph River in sec. 13, T7S, R18W.

Fighting Island: [Essex Co. Ontario, Canada, in Detroit River.]

First Woods [WASHTENAW]: formerly at SW corner Stadium Blvd. and Packard, Ann Arbor.

Five Lakes [MUSKEGON]: a group of five drying lakes/hollows strongly dependent on water tables, in southwest part of Eggleston Tp. (T10N, R15W); Carr Lake is the largest (and the only one with a name—that once reportedly encompassed all); cf. McLouth in 1900, *Scirpus hallii*, et al. Part of the area is now a sanctuary of the Michigan Nature Association. [I know of no plant collections from Five Lakes, formerly a settlement and P.O. in Lapeer Co.; cf. Romig.]

Five Pts. [WAYNE]: Redford Tp. (OAF in 1932). [P.O. here only in 1918 *fide* Romig.]

Five-mile Pt. [KEWEENAW]: (OAF 1943).

Flanders meadow [OAKLAND]: Avon [Tp.] (cf. DC label for *Carex tenera*).

Flint Steel River: [ONTONAGON]

Floodwood [SCHOOLCRAFT]: sec. 14, T43N, R14W, on the Manistique River (CKD in 1915; cf. Mich. Geol. Biol. Surv. Publ. 31, p. 75. 1921). [Not to be confused with a Floodwood in NW Dickinson Co., from which no plant collections have been seen.]

Flummerfelt's [OAKLAND]: Oakland [Tp.] (cf. DC 1848 label for *Muhlenbergia glomerata*). [The old 223-acre farmstead was cleared for development early in 2004.]

Forestry Farm [WASHTENAW]: = Saginaw Forest (q.v.), Ann Arbor.

Fork Township [MECOSTA]: (S. Lane Wilson in 1961–1978, MSC).

Fraser's Grove [KALAMAZOO]: southeast of Vicksburg (cf. CRH 1947, p. 127).

Frazer's (or Fraser's) [CRAWFORD]: SW¼ NW¼ sec. 26, T27N, R1W, on North Branch of the Au Sable River (Voss & Crow 1976, p. 40); sometimes erroneously attributed to Oscoda Co. (CFW et al. in 1888).

Fruit Belt [KALAMAZOO]: old RR line in NW part of Texas Tp. (cf. CRH label for *Tephrosia virginiana*).

## G

Galien River [BERRIEN]: river is entirely in the county.

Garden City [KEWEENAW]: old mine site near Eagle River (OAF 1943; coll. 1886, 1940, etc.). [Not the Garden City in Wayne Co., W of Dearborn.]

Gates Bog [CHEBOYGAN]: sec. 22, T37N R3W (UMBS).

Geddes [WASHTENAW]: N½ sec. 36, Ann Arbor Tp.

Col. George's Estate [OAKLAND]: sec. 17, Bloomfield Tp. [Not to be confused with the E. S. George Reserve, given by Col. George in 1930 to the University of Michigan, in Livingston Co.]

Gleason's Bog [CHEBOYGAN]: just E of Bryant's Bog (q.v.) (UMBS).

Glenn Island [INGHAM]: in Grand River just S of Grand Trunk RR bridge in Lansing (cf. Foster 1942, p. 492).

Glenn Pier [ALLEGAN]: W of Glenn, NW¼ sec. 31, Ganges Tp.(C. H. Kauffman in 1910 and associated by him with South Haven; cf. Mich. Manual maps).

Goff Plains [MACOMB]: Shelby [Tp.] (cf. DC labels for *Carex muhlenbergii, Bromus kalmii, Pyrola rotundifolia*).

Goguac Lake [CALHOUN]: SW of Battle Creek (E. L. Greene in 1902, ND-G).

Gorge [CHEBOYGAN]: ravine at source of Carp Creek in sec. 33, R37N R3W (UMBS).

Government Marsh [ST. JOSEPH]: 6 miles SW of Vicksburg (cf. F. W. Rapp label for *Sorghastrum nutans*).

Grand Marais [ALGER or KEWEENAW]: harbor (so known since 1660) and village in Alger Co.; a less well-known harbor E of Eagle Harbor, Keweenaw Co.). [There is also a third Grand Marais on Lake Superior, in Cook Co., northeasternmost Minnesota.]

Grand River at Mill Rd. [WAYNE]: Mill Rd. = Southfield Rd.

Grand Traverse Bay [cf. Traverse Bay and Little Traverse Bay entries below.]

Grapevine Pt. [CHEBOYGAN]: W of South Fishtail Bay in Douglas Lake, sec. 28, T37N, R3W (UMBS).

Gratiot Range [KEWEENAW]: (OAF 1943).

Gratiot River [KEWEENAW]: (Lewis Foote in 1865). [A county park is now at the river mouth.]

Graveraet River [HOUGHTON]: mouth on Lake Superior SW of Salmon Trout River (cf. also Peters in Mich. Hist. Rev. 27(1): 82–85. 1991).

Great Lakes Engineering Plant [WAYNE]: shipyards on the Detroit River at Ecorse (CB, Sept. 18, 1915; cf. label for *Echinochloa walteri*).

Green [ONTONAGON]: (Pammel & Fisk in 1926; but there are other Green(e)s in Michigan).

Green's [MACOMB]: Lazarus Green's (DC in 1839), sec. 28, Washington Tp. (cf. county history).

Green Star Trail [CHEBOYGAN]: crosses secs. 34 and 35, T37N, R3W (UMBS).

Greenwood Park [BERRIEN]: sec. 21, Hagar Tp.

Gregoryville [HOUGHTON]: also Gregory Springs (OAF). Gregory was at the N end of Torch Lake, opposite Lake Linden (cf. old Calumet quad. topo map).

Gull Prairie [KALAMAZOO]: near Richland (which formerly bore this name; First Survey in 1838; cf. McVaugh 1970 and Romig).

Gull Rock [KEWEENAW]: off the west end of Manitou Island (cf. Beacon 20(2): 8–10, Summer 2002 and 20(3): 21, Fall 2002). [Not to be confused with Gull Islands NE of Passage Island, Isle Royale Natl. Park.]

Gun Lake [ALLEGAN/BARRY]: less than 3% of the area of this lake is in Allegan Co.; the rest is in Barry Co., including the large peninsula in the lake, where some collections have specifically been made. However, the Post Office of the same name (closed in 1905) is listed as in Allegan Co., presumably because the mail came via Shelbyville in that county. "Gun Lake" collections almost certainly are from Barry Co.—where also Yankee Springs State Park now has frontage on the lake.

## H

Haddon [MACOMB]: sec. 23, Washington Tp.

Hamilton at Belt Line [WAYNE]: (CB).

Hammond Woods [WASHTENAW]: (OAF 1943; cf. also map in Walpole 1924).

Harwoods' Woods [WASHTENAW]: NE¼ sec. 27, Pittsfield Tp. (Ruth B. [Alford] MacFarlane coll. and pers. com. 2002); cf. also Cady's above. Now included in the Pittsfield Preserve (of the township of the same name).

Hayes Pt. [KEWEENAW]: at Copper Harbor (cf. map in Mich. History 61: 225. 1977).

Hazel [HOUGHTON]: probably near Lake Linden (OAF Oct. 7, 1934; attributed to Houghton Co. by OAF in Am. Fern Jour. 27: 12. 1937).

Hebard Park [KEWEENAW]: county park, sec. 26, T59N, R29W.

Hemlock Island [CASS]: in Magician Lake (cf. H. S. Pepoon's labels).

Henry's Woods [BAY]: in Bay City (*fide* annotation in unknown hand on 1894 G. M. Bradford specimen of *Uvularia grandiflora* at MSC).

Hermit's [CHEBOYGAN]: in Reese's Bog (q.v.), sec. 5, T36N, R3W (UMBS).

Hersey's [OAKLAND]: James Hersey's mill pond, Oakland [Tp.] (cf. DC 1852 label for *Carex richardsonii*). [But Romig locates James Hersey's sawmill, built in 1824, in Avon Tp.—which was not separated from Oakland Tp. until 1835, while other sources locate it, built in 1819, more precisely in S½ sec. 10, Avon Tp.]

Hickory Flats [WASHTENAW]: variously located (if at all) on labels ca. 1924–1925 as 5 or 6 miles south of Ann Arbor; no more precise site seems known (cf. labels, e.g., for *Plantago cordata*, *Zanthoxylum americanum*).

Hidden Lake Gardens [LENAWEE]: in Franklin Tp., ca. 2 miles W of Tipton.

Highland Park [KENT]: a municipal park of this name is in Grand Rapids, north of the Grand Trunk RR and east of the Grand River.

Highland Park [OTTAWA]: a resort at Grand Haven (Mary B. Fallass in 1893–1896, etc.). [The elegant 19th century Highland Park Hotel was destroyed by fire in December of 1967.]

Highland Park [WAYNE]: A town now completely surrounded by Detroit; this is the Highland Park most often meant by collectors, at least from the Detroit area.

Hill's Creek [KEWEENAW]: mouth on Lake Superior ca. 1 mile SW of Gratiot River (cf. Lewis Foote 1865 label for *Ranunculus reptans*). [Sometimes corrupted to "Mill Creek" on maps.]

Hill's pond [MACOMB]: (DC in 1845), N½ SW¼ sec. 27, Ray Tp. (cf. 1859 map).

Hog Creek [ST. JOSEPH]: (First Survey in 1838; cf. McVaugh 1970, p. 242).

Hog Island [WAYNE]: = Isle au Cochons, in 1845 renamed Belle Isle, in Detroit River; also once known as Rattlesnake Island (q.v. and cf. Beacon 18(4): 4, Winter 2000–01). [Not to be confused with Hog Island in the Beaver group, Charlevoix Co. Furthermore, ca. 7 miles E of Naubinway (Mackinac Co.) are Hog Island Creek, Hog Island Pt., Little Hog Island (in Lake Michigan), and Hog Island Rd. leading to Rexton.]

Hogback Rd. [CHEBOYGAN]: on the high ground above N end of Reese's Bog (q.v.) (UMBS).

Holland [ALLEGAN/OTTAWA]: 32nd St. is the county line: higher numbers are in Allegan Co., lower numbers in Ottawa Co.

Hoop Lake [CHEBOYGAN]: near center N edge sec. 2, T36N, R1E; a bog near (but not connected with) the marl-forming chain of Twin Lakes (UMBS).

Hosner Marsh [MACOMB]: Washington [Tp.] (DC in 1843 etc.; but most Hosner properties were in Bruce Tp. *fide* plat maps).

Houghton, Douglass, Creek [KEWEENAW]: (OAF 1943).

Houghton, Douglass, Falls [HOUGHTON]: ca. 1 mile NW of Lake Linden.

Houghton, Mt. [KEWEENAW]: (OAF 1943).

Howell Junction [LIVINGSTON]: = Annpere, ca. 1 mile SE of Howell.

Hubbardston [IONIA]: note that the village borders on Clinton Co. and specimens may be from that county. Erwin F. Smith's home was 3.5 miles E of Hubbardston and thus well into Clinton Co. [See also entry for Deer Lick.]

Hunter's Point [KEWEENAW]: (OAF 1943).

## I

Incline [HOUGHTON]: (a frequent collection site for OAF; "the Lake Linden terminus of the railroad from which the rock cars were switched to the rope-controlled inclined-plane railway leading to the stamp mills and the docks."—C. Harry Benedict, *Red Metal: The Calumet & Hecla Story*, p. 116. 1952).

Indian Village [WAYNE]: in Detroit, between Jefferson Ave. and Mack Ave. (CB in 1914).

Ingleside [CHEBOYGAN]: resort area on NW side of Douglas Lake, near Bessey Creek (q.v.) in sec. 17, T37N R3W (UMBS).

Iron River [ONTONAGON]: just west of Silver City (H. Gillman in 1868); not the outlet of Lake Independence in Marquette Co., nor the community in Iron Co. Little Iron River of Gillman is just a mile farther west.

Irwin's Woods [WASHTENAW]: sec. 4, Sharon Tp. (T3S, R3E).

Island Lake [LIVINGSTON]: (OAF July 16, 1905; CFW May 31, 1898) [there are ca. 30 other Island Lakes in Michigan].

Isle aux Pêches [Essex Co., Ontario, Canada] (CFW in 1892, etc.; cf. Peach I. below).

Isle Royale Mine [HOUGHTON]: just south of Houghton [not on Isle Royale, although there was an "Isle Royale and Ohio Mine" there].

Isle Royale Stamp Mill: moved in late 1880s from Houghton [Houghton Co.] to Republic [Marquette Co.] (cf. Mich. History 53: 115. 1969).

## J

Jam One [KALKASKA]: original name for Sharon (changed when a Post Office was established), where the North Branch of the Manistee River flows into the Manistee, near NW corner of T25N, R6W (CFW et al. in 1888; cf. Voss & Crow 1976, pp. 54–55).

Jenison Park [OTTAWA]: W end of Lake Macatawa (*fide* 1932 county map).

Jennings [MISSAUKEE]: in Lake Tp., Missaukee Co., but in 1922 most of the town was moved 11 miles west to Cadillac in Wexford Co. (cf. Chronicle 22(2): 13, July–Aug. 1986).

Junior [OAKLAND]: (OAF collected here and at Harris July 13, 1918)

## K

Kady's [WASHTENAW]: a misspelling on some labels = Cady's (q.v.).

Kapp, G. W. [MACOMB]: wheat field, meadow, Washington [Tp.] (DC, cf. 1845 labels for *Carex tenera* and *C. formosa*).

Keeler Marsh [MACOMB]: Washington [Tp.] (DC in 1839 and 1849, cf. labels for *Carex lanuginosa* and *C. sartwellii*).

Keeler's, N. [MACOMB]: sec. 21 and 28, Washington Tp. (fide 1859 plat map). [Not the crossroads of Keeler in Van Buren Co.]

Keweenaw Point [HOUGHTON/KEWEENAW]: [Most 19th century collectors did not restrict this "Point" to the tip of the Keweenaw Peninsula, as modern maps show it, but included at least the northern portion of Houghton Co. (or even parts of Ontonagon and Baraga counties; cf. Voss, 1978, p. 77). Map in Foster and Whitney 1850 indicates the Point as far S as latitude of Houghton; and an 1832 observation by Lt. Allen (in Mason 1958, p. 178) notes that the "Point" is "often applied to the whole peninsula."]

Keweenaw Portage [HOUGHTON]: the Portage Lake Ship Canal, completed in 1874, now accommodates small boats crossing the Keweenaw Peninsula via Portage Lake, where the early explorers had to portage their canoes to avoid the long (and dangerous) route around Keweenaw Point; David B. Douglass, Douglass Houghton, and others found such bog species as orchids and pitcher-plants along the portage. The north end of the present canal is at the west end of McLain State Park.

Killarney Point [GOGEBIC]: on Tenderfoot Lake, not in Wisconsin as labeled by P. E. Hebert (*fide* B. Hellenthal).

Kline Farm [MACOMB]: Shelby [Tp.] (DC in 1853, cf. label for *Ranunculus flabellaris*).

Knapp swale [MACOMB]: Washington [Tp.] (DC, cf. label for *Scirpus atrovirens*).

Kruzel's Bog [EMMET]: NW¼ sec. 25, T35N, R5W (UMBS; now the Orchis Fen Preserve of Little Traverse Conservancy).

## L

Lake Glazon [KEWEENAW]: sec. 28, T59N, R3W (OAF).

Lake Louise [CHARLEVOIX]: = Thumb Lake, in Hudson Tp.

Lamb's [MACOMB]: Lamb's meadow, Washington [Tp.] (cf. DC 1845 label for *Carex tenera*).

LaSalle Island [MACKINAC]: in Les Cheneaux, north end of Lake Huron (J. R. Churchill in 1910, MO, and misleadingly said on his labels to be "near Sault Ste. Marie").

Laughing [White] Fish River [ALGER]: (Gillman in 1867; similarly, Laughing Fish Pt.).

Lawrence Marsh [MACOMB]: Washington [Tp.] (cf. DC label for *Solidago patula* hybrid).

Leach's [MACOMB]: Ike Leach's, Washington [Tp.] (cf. DC label for *Carex cristatella*).

Leadley Park [INGHAM]: amusement park on N side of Grand River, promoted about 1892 and later named Waverly Park (on E side of Waverly Rd.) (*fide* an unrelated Mr. Leadley of Lansing, phone Dec. 1961, and cf. Foster 1952, p. 498) (Kedzie in 1893, MSC).

LeFurge Woods [WASHTENAW]: sec. 27, T2S, R7E (Superior Tp.). A frequent collection site for OAF and others, now in the 325-acre LeFurge Woods Nature Preserve of the Southeast Michigan Land Conservancy.

Lennox Ave, [WAYNE]: Detroit (OAF 1943).

Limberlost [OAKLAND]: Bloomfield Tp.

Limestone Mt. [HOUGHTON]: T51N, R35W. [Not in Baraga Co., as stated by N. C. Fassett on July 2, 1938, labels.]

Linden Park [WAYNE]: Detroit (was in Hamtramck [Tp.] (cf. Farmer, p. 4).

Linwood [HOUGHTON]: at Lake Linden (OAF collected here Sept. 19, 1941. [Not to be confused with the much better-known Linwood in Bay Co.]

Little Lake [MARQUETTE]: ca. 3–5 miles E of Gwinn; this is presumably the "Little Lake" of Dachnowski in 1906, although not in the Marquette Quadrangle (neither is the very much smaller Little Lake just W of Teal Lake); the town of the same name (but P.O. then called Forsyth) was on the Chicago & Northwestern RR 22 miles SE of Negaunee—suggesting that Dachnowski traveled through Little Lake and Sands (q.v.).

Little Traverse Bay [HOUGHTON]: on west side of Keweenaw Bay, ca. 3–4 miles S of Keweenaw Co. (OAF July 28, 1939). [Not to be confused with the better known Little Traverse Bay in Emmet Co.]

Livingston Bog [CHEBOYGAN]: in sec. 2, T36N, R3W (UMBS).

Locke's [Corner]: [OAKLAND]: (OAF 1943; cf. CB labels for *Quercus muehlenbergii* "near Farmington" and *Fraxinus quadrangulata* "near Farmington Jct.").

Loda Lake [NEWAYGO]: 2 miles N of Diamond Lake.

Long Lake [GENESEE]: = Lake Fenton (cf. Soil Survey publ. in 1914).

Longyear Tract [MARQUETTE]: ca. 5 miles W of Marquette.

Lookout, Mt. [KEWEENAW]: sec. 3, T58N, R3W. The Nature Conservancy now has a preserve there.

Lothrop [WAYNE]: (OAF on Oct. 21, 1917; CB collected same day at Grosse Pte.).

Lowell Mills [WASHTENAW]: on Huron River in Superior Tp.; in 1850s a sawmill here, near where Ypsilanti Paper Co. was later located (coll. by F. B. H. Brown in 1901 and N. A. Harvey later ; cf. Chapman, *History of Washtenaw County*, pp. 1073, 1143, and 1204. 1881). [Sometimes on labels merely as "Lowell"—easily confused with the village and township of the same name in Kent Co.]

Lumberjacks Park [GRATIOT]: W of Alma on Pine River, in SE¼ sec. 18, T12N, R4W.

Lyons [MACOMB]: Elias Lyons, Ray [Tp.] (cf. DC label for *Carex plantaginea*, May 30, 1852).

Lyons [MACOMB]: Washington [Tp.] (cf. DC label for *Aster dumosus*, Sept. 11, 1837).

## M

M b [OAKLAND]: Marl bed at Parkedale (q.v.) (OAF; cf. Rep. Mich. Acad. 15: 151, etc. 1915).

Mack Ave. woods [WAYNE]: Detroit (OAF 1943; cf. also Rep. Mich. Acad. 20: 187. 1919).

MacCurdy Ecological Tract [MONTCALM]: includes Vestaburg Bog (q.v.; cf. also Crispin 1980).

Mackinaw City [CHEBOYGAN/EMMET]: Although usually listed as being in Cheboygan Co. (where the Post Office and most of the business district are), by far the greater part of the area of the village has long been in Emmet Co. (the south end of the Mackinac Bridge now marking the division point). [Note that this name has never applied to Mackinac Island (Mackinac Co.), although vague terms like "Mackinaw" and "Michilimackinac" often referred in times past to the whole general area.]

Macon Creek (or River) [LENAWEE/MONROE]: (Folwell in 1832; cf. Mich. Bot. 17: 180 footnote. 1978).

Magician Beach [CASS/VAN BUREN]: Most H. S. Pepoon labels cite Van Buren Co., but a map in his unpublished flora of Magician Lake clearly shows Magician Beach in *both* counties.

Malony (Malone) Lake [CHEBOYGAN]: sec. 11, T38N, R3W.

Mama Juda Isl. [WAYNE]: in Detroit River E of N point of Grosse Isle (cf. Farmer, p. 7, and Beacon 18(2): 8–11, Summer 2000).

Mamie Lake [?GOGEBIC]: T44N, R41W, on Wisconsin border. [HTD wrote (Rep. Mich. Acad. 22: 148. 1921) that his (and EAB's) Gogebic County headquarters in 1919 were "at Bent's camp on the south side of Mamie Lake and less than a mile from the Wisconsin line." The lake was said to cover "nearly a square mile." The location for their 1920 field work was likewise "in the vicinity of Bent's Camp in the southeastern part of the county." (Pap. Mich. Acad. 1: 74. 1923). Dr. Darlington confirmed in conversation with me that the camp was on the south side of Mamie Lake. Yet, Michigan maps show Mamie lake almost entirely in Wisconsin (and Wisconsin maps concur), with barely the northern tip extending into Michigan. Bent's Resort is shown at the S end of Mamie lake, in Wisconsin well south of the Michigan line (not north of the state line), in a map [?1932] of Gogebic County, drawn by George W. Koronski, Gogebic County Engineer; however, on that map a narrow strait of Mamie Lake is shown north into Michigan. How far from "Bent's Camp" HTD and EAB collected would determine the county (Gogebic in Michigan or Vilas in Wisconsin). And of course "Mamie Lake" may once have included what later maps separately identify as East Bay

Lake (entirely in Michigan) and West Bay Lake (partly in Michigan), these three areas separated from each other by more or less narrow straits, with East Bay even included in West Bay Lake in a 1917 plat map.]

Manhattan Mine [KEWEENAW]: immediately south of Cliff Mine (q.v.), but never achieved its production.

Manitou Isl. (and adjacent Gull Rock) [KEWEENAW]: (cf. Beacon 20(2): 10–12, Summer 2002). [North Manitou and South Manitou islands in Lake Michigan are entirely different, in Leelanau Co.]

Manly farms [MACOMB]: Macomb [Tp.] (cf. DC 1845 labels for *Carex intumescens* and *C. retrorsa*). "J. W. Manley's farm" on 1845 *Sparganium eurycarpum* label is uncertain; 1875 plat shows it in sec. 3, Shelby Tp., but there is no such clue on 1859 plat.

Marl Bay [CHEBOYGAN]: northwest bay of Douglas Lake (UMBS).

Mason [BRANCH]: an old name (also Masonville) for Coldwater (First Survey; cf. McVaugh 1970, pp. 242–243). [Do not confuse with city of Mason, county seat of Ingham Co.—nor with Mason Co. or any of the three or more other Masons in Michigan, all presumably named for the state's first governor, Stevens T. Mason.]

McCallum's Creek [HOUGHTON]: E of Torch Lake (OAF 1943).

McCracken's marsh [MACOMB]: Washington [Tp.] (cf. DC label for *Aster lateriflorus*).

McCracken's [OAKLAND]: John McCracken's, Avon [Tp.] (cf. DC 1848 label for *Carex eburnea*).

McGregor's [MACOMB]: Washington [Tp.] (cf. DC 1840 label for *Aster lanceolatus*).

Meadow Mine [KEWEENAW]: (OAF 1943).

Menominee River Station [MENOMINEE]: (See Camp 7 above, CAD in 1905).

Merriweather [ONTONAGON]: on Lake Gogebic (L. H. Pammel in 1926).

Mesnard, Mount [MARQUETTE]: sec. 34–35, T48N, R35W (Dachnowski in 1906 et al.; cf. Rep. Mich. Acad. 9: 89. 1908).

Michigan Hollow: [This is a sedge fen ca. 16 km SW of Ithaca, New York, and is not in the state of Michigan at all.]

Michigan State Col.: [Specimens so labeled by Asa Gray (GH) were sent to him by the First Survey and refer to a State Collection, *not* to the Michigan Agricultural College, which was not founded until 1855, with the name changed to Michigan State College in 1925. Attributing these specimens to Ingham Co., as done in some monographs (cf. discussion of some *Lysimachia* taxa in Mich. Bot. 6: 20–21. 1967), is a gross anachronism; the specimens in fact came from various sites around the state (cf. also McVaugh 1970).]

Middle Beach [OAKLAND]: (OAF 1943, for specimen from M. T. Bingham).

Military Hill [ONTONAGON]: near Lake Mine (Greenland Tp.).

Mill Rd. [OAKLAND/WAYNE]: = Southfield Rd. (OAF collections of June 23, 1920, are from Wayne Co. [OAF 1943]).

Mill Rd. & Grand River [WAYNE].

Mill Rd. woods [WAYNE]: Detroit (Redford) (cf. OAF labels for *Polygonatum pubescens* and also citations in Am. Midl. Nat. 11: 76–77. 1928).

Miller's [MACOMB]: Jo. Miller's, Washington [Tp.] (cf. DC labels for *Agrostis gigantea, Agropyron trachycaulum, Sphenopholis nitida, Linum virginianum*).

Miller's [MACOMB]: Worcester Miller's, Washington [Tp.] (cf. DC 1848 label for *Carex normalis*).

Milwaukee Jct. [WAYNE]: RR junction 4 miles N from Detroit station on the Grand Trunk system (cf. Mich. Man.).

Mines. Locating old mine-sites can be a problem, but some early botanists did collect at such locations. (Some mining operations imported physicians from New England, and some of these—as was common in that day—collected plants. James Watson Robbins is perhaps the most prolific of the physicians who collected in the "Copper Country" [see Voss 1978, p. 77].) A number of individual mines appear alphabetically in this Gazetteer. Many old mine locations are indicated to this day on county maps, sometimes as names of associated settlements (or ghost towns). In addition, the following list of early copper mines may prove helpful; the locations are from a "Tabular Statement of the Mines in the Lake Superior Land District" (in Foster & Whitney 1850, pp. 146–151); counties are added but not all sites are verified (e.g., the first one):

Adventure [ONTONAGON]: SW¼ sec. 35, T58N, R38W [evident error for T51N (the indicated tp. does not exist)].

Albion [KEWEENAW]: sec. 11, T57N, R32W.

Bohemian [KEWEENAW]: SE¼ sec. 29, T58N, R29W.

Cliff [KEWEENAW]: SW¼ sec. 36, T58N, R32W.

Copper Falls [KEWEENAW]: SE¼ sec. 11, T58N, R31W.

Douglass Houghton [ONTONAGON]: NW¼ sec. 15, T51N, R37W.

Forest [ONTONAGON]: SW¼ sec. 30, T50N, R39W.

Forsyth [KEWEENAW]: SE¼ sec. 33, T57N, R32W.

Lac La Belle [KEWEENAW]: NE¼ sec. 32, T58N, R29W.

Minesota [ONTONAGON]: NW¼ sec. 15, T50N, R39W [due to an alleged clerical error, originally spelled this way and not "Minnesota" as intended (cf. also Romig and Mich. History 82(6): 20, Nov.–Dec. 1998)].

North American [KEWEENAW]: NE¼ sec. 2, T57N, R32W.

Northwest [KEWEENAW]: sec. 15, T58N, R30W.

Northwestern [KEWEENAW]: sec. 24, T58N, R31W.

Ohio & Isle Royale [KEWEENAW (Isle Royale)]: SE¼ sec. 34, T66N, R34W.

Ohio Trap Rock [KEWEENAW (Isle Royale)]: SW¼ sec. 5, T49N, R40W.

Phoenix (formerly Lake Superior) [KEWEENAW]: secs. 19 and 20, T58N, R31W [but later maps have Old Phoenix Mine in sec. 30].

Pittsburg & Isle Royale [KEWEENAW (Isle Royale)]: NW¼ sec. 12, T65N, R36W.

Siskawit [KEWEENAW (Isle Royale): SE¼ sec. 34, T66N, R34W.

Misery Bay [ONTONAGON]: at mouth of Misery River near Houghton County line, on Lake Superior (OAF 1943; Lewis Foote in Aug. 1865—but there is also a Misery Bay in Alpena Co.).

Monfore [MACOMB]: vic. of Disco, Shelby [Tp.] (cf. DC labels for *Polygonum hydropiperoides* and *Solidago speciosa*).

Mont Lake [LIVINGSTON]: ca. 3.5 miles N of Brighton (now = Clark Lake) on line between sec. 7, T2N, R6E, and sec. 12, T2N, R5E (Mary Clark collected here ca. 1838).

Montreal [HOUGHTON]: (OAF 1943).

Montreal River [KEWEENAW]: (OAF 1943).

Moon's marsh [MACOMB]: (?sec. 7, Washington Tp. [only Moon property in 1859 Macomb Co. plat]; cf. DC label for *Gentianopsis procera*).

Morris' farm [MACOMB]: Benj. Morris', Ray [Tp.] (DC in 1845, cf. label for *Lactuca biennis*).

Morrison's [MACOMB]: Shelby [Tp.]: (DC in 1841).

Mount(ain): [see specific name].

Mud Lake [ALCONA]: renamed Barton City in 1912 (CFW et al. in 1888; cf. Voss & Crow 1976, p. 29).

Mud Lake [CHEBOYGAN]: the most often cited (UMBS) Mud Lake in Cheboygan Co. is mostly in sec. 7, T37N, R2W (Inverness Tp.); much of the bog is now in the Wendy O'Neil Preserve of the Little Traverse Conservancy. Some other of the county's Mud Lakes have been "renamed" by UMBS people (cf. Blanchard Lake above).

Mud Lake [probably DICKINSON]: Of over 300 "Mud Lakes" in Michigan, there appear to be none "25 miles southeast of Ishpeming" (F. P. Metcalf, Sept. 1922), which would be in Alger Co.; however, there are several in northeastern Dickinson Co., ± SSW of Ishpeming, and probably where the collector was (cf. his labels for *Andromeda glaucophylla* and *Ledum groenlandicum*, A).

Mud Lake [WASHTENAW]: ca. 2 miles SW of Whitmore Lake in Webster Tp. and now a research property of the University of Michigan (Crispin 1980); but there are 6 other Mud Lakes in the county indexed by Humphrys, not including any in R2S, R7E (Superior Tp.), as apparently mapped by Walpole (1924).

## N

Natural Wall [HOUGHTON]: ravine near Old Colony Mine, which was in sec. 18, T56N, R32W (OAF Aug. 26, 1935).

Neasmith Crossing [KALAMAZOO]: on Grand Trunk RR, Schoolcraft Tp. (CRH, cf. his *Flora*, p. 255, under *Rudbeckia triloba*).

Neithercut Woodland [CLARE]: sec. 17, T17N, R5W (Surrey Tp.) (an outdoor education tract of Central Michigan University).

Nelson Lake [CHEBOYGAN]: on line between secs. 15 and 22, T38N, R3W; a county road bisects the [drying or intermittent] lake, which shows on older county maps as Nolten Lake, as does a different lake (UMBS).

New Baltimore [MACOMB/ST. CLAIR]: on the county line (OAF's nos. 8551–8569 in 1929 are attributed to the St. Clair Co. side of the line [cf. his field notes]; he attributes 6389 and 6390 in 1922 to Macomb Co. Some other collectors may not have been so precise). For A. J. Pieters' 1893 collections from Lake St. Clair near New Baltimore (cf. Bull. Mich. Fish Comm. 2. 1894), his map shows no county line—which would be just W of 80°45'W longitude as shown on his map; if a label mentions some specific site or station in the lake, it may be possible to assign a county.

New England Mine [MARQUETTE]: sec. 16, T47N, R27W (Mary Clark in 1871 and 1872).

Newburg Dam [CALHOUN]: on N Branch, Kalamazoo River, 0.5 miles W of Jackson Co. line.

Nichols' Bog [CHEBOYGAN]: a farm pond in sec. 2, T36N, R3W (UMBS).

Nigger Creek [CHEBOYGAN]: now renamed as the less offensive "Mullett Creek," flowing into Mullett Lake ca. 2 miles NE of Topinabee (UMBS).

Nolten Lake [CHEBOYGAN]: on older maps = Nelson Lake (see above); both older and later maps (incl. USGS Mullett Lake quad) show a lake of this name in sec. 18, T38N R3W and this is also known as Nolten Fen (UMBS).

Normal [MARQUETTE]: = Northern State Normal School (now Northern Michigan University), Marquette (A. Dachnowski in 1906). ["Normal" is also shorthand on labels (CMC) for the Central State Normal School (now Central Michigan University) in Mt. Pleasant. Similarly, expect the same cryptic abbreviation for the former Normal Schools in Kalamazoo (Western Michigan University) and Ypsilanti (Eastern Michigan University), so that context such as origin of herbarium specimens may be needed for interpretation.]

North Cliff Pond [KEWEENAW]: (OAF 1943).

North Park [KENT]: west of Softwater Lake.

Norton Hills [OAKLAND]: Oakland [Tp.] (cf. DC 1839 label for *Carex muhlenbergii*).

Norton's [MACOMB]: Hugh Norton's meadow, Ray [Tp.] (cf. DC label for *Carex tenera*).

## O

Oak Grove [BAY]: presumably sec. 8, T14N, R6E (G. M. Bradford in 1893 and 1901).

Oakwood [WAYNE]: site noted for halophytes, on River Rouge in sec. 28, Ecorse Tp. Originally named Navarre, renamed Oakwood in 1918, but annexed by Detroit in 1922 (Romig). (OAF, CB, et al. Sept. 23 and 30, 1916; Sept. 15, 1918; cf. Rhodora 18: 243–244 [1916] and Am. Midl. Nat. 11: 46 [1928], under *Cyperus esculentus*; also Sept. 30, 1930; and cf. F. B. H. Brown in Rep. Mich. Acad. 19: 219 [1918]).

Osceola Mine [HOUGHTON]: ca. 1 mile N of the village of Osceola, near Laurium—nowhere near Osceola Co. in the Lower Peninsula.

Ott Preserve [CALHOUN]: Harvey N. Ott Preserve, 315-acre natural area in secs. 3, 4, 9, and 10, T2S, R7W (Emmett Tp.). Established in 1926 as the Battle Creek College Biological Preserve; when that college closed, Albion College obtained the tract and dedicated it as the Ott Preserve; sold in 1977 by Albion to Calhoun County to be administered through the Parks Commission (Crispin 1980; pers. comm., W. J. Gilbert).

Overlook Farm [CHARLEVOIX]: SW¼ sec. 22, Eveline Tp. (Eisendrath in 1959–1970).

Owen Woods [WAYNE]: Detroit (cf. 1900 W. Cook label for *Aster laevis*).

## P

Paige (Page) [EMMET]: on Little Traverse Bay (near S edge sec. 16, T35N, R5W) along the RR between Menonaqua Beach and Ramona Park. (cf. 1902 plat map); CWF often collected here 1899–1923.

Palmer Park [WAYNE]: in Detroit (cf. Mich. History 65(2): 29–32, March–April 1981).

Palmer's Farm [OSCODA]: Dr. Oscar Palmer's farm was in sec. 6, T26N, R1E (CFW et al. in 1888; cf. Voss & Crow 1976, pp. 39–40, footnote 49).

Paradise [GRAND TRAVERSE]: community near the Kingsley RR station and later incorporated into the village of Kingsley, in Paradise Tp. (CFW et al. in 1888; cf. Voss & Crow 1976, p. 61). [Quite different from the village of Paradise on Whitefish Bay in Chippewa Co.]

Paris [KENT]: collectors in the Grand Rapids area (e.g., H. M. Bailey in the 1890s) refer to Paris Tp., in Kent Co.—not to the Mecosta Co. community (originally named Parish for a founder, but the final *h* was inexplicably dropped; cf. Mich. History 71(2): 15, March–April 1987).

Parkedale [OAKLAND]: near Rochester (S of the Van Hoosen farm). OAF collected extensively here, at the research property owned by his employer, Parke, Davis & Co., which acquired it in 1908. [Three photos of the "Parke-Davis Biological Farm" are between pp. 46 and 47 in Eula Pray, *History of Avon Township 1820–1940* (Ann Arbor, 1986), with relevant text on pp. 55–58. The facility was sold in 1998 by Warner-Lambert, which had absorbed Parke, Davis. For OAF's flora of Parkedale, including description and map, see Rep. Mich. Acad. 15: 150–192. 1914.]

Partridge Brook [MACOMB]: John Adams' land = ca. l mile N of Disco, Shelby Tp. (cf. DC label for *Cuscuta gronovii*).

Partridge Island [MARQUETTE]: in Partridge Bay of Lake Superior, NW of Marquette.

Patton's Marsh [KALAMAZOO]: 1 mile SE of Harrison Lake, Prairie Ronde Tp. (CRH, cf. his *Flora* p. 159).

Pawpaw Woods [WASHTENAW]: sec. 1, Lodi Tp. (cf. FJH labels for *Populus heterophylla* and *Epifagus virginiana*).

Peach [orig. Pêche] Island: [Essex Co., Ontario, Canada—E (upstream) of Belle Isle, at source of Detroit River (cf. Farmer, p. 7)].

Pennnellwood [BERRIEN]: S of Berrien Springs.

Penny Lake [CHEBOYGAN]: NE¼ sec. 15, T38N R3W (UMBS).

Peter White's Camp [ALGER]: 800 acres on Whitefish Lake, ca. 4 miles S of Deerton. CKD collected here in 1916; cf. R. D.Williams, 1905, *The Honorable Peter White*, pp. 201 and 203). [The property is now included in the 1700-acre Laughing Whitefish Lake Preserve of The Nature Conservancy, presented in 1993 by relatives of Peter White (an early founder of Marquette) and of George Shiras III (White's son-in-law) (cf. Mich. Conservancy News, Spring 1993.]

Pewabic Mine [HOUGHTON]: associated with the Quincy Mine (which purchased it in 1891) on the north side of Portage Lake at Hancock.

Phillips farm [KENT]: see Felt-boot factory, above.

Philps [?] [?MACOMB]: (DC 1852 label for *Glyceria septentrionalis* has "Philps" but no tp.; 1875 Macomb Co. plat map shows J. & N. Phelps in Washington and Bruce Tps.).

Pickerell Lake [MARQUETTE]: = Harlow Lake near Little Presque Isle, NW of Marquette (Dachnowski in 1906; cf. 1907 topo map).

Pier Cove [ALLEGAN]: lumber port in sec. 5, T2N, R16W (cf. 1901 soils map; mail was supplied through the Ganges P.O. a mile to the SE).

Pigeon or Pigeon Prairie [ST. JOSEPH]: near White Pigeon (First Survey in August 1837); cf. McVaugh 1970, p. 243).

Pine Lake [CHARLEVOIX]: = Lake Charlevoix.

Pine Lake [INGHAM]: name changed to Lake Lansing 1929–30. (There are about 30 other Pine Lakes in Michigan. The P.O. at this one, established in 1879, was changed to Haslett in 1890; cf. Ceasar p. 56.)

Pine Pt. [CHEBOYGAN]: on Douglas Lake near middle of its east side (UMBS).

Pingree Woods [OAKLAND]: (OAF 1943).

Point Detour [DELTA]: at tip of Garden Peninsula (Lewis Foote on Sept. 22, 1863, was at this place ["N. W. shore L. Michigan" on his label for *Calamintha arkansana*]—not the eastern tip of the Upper Peninsula mainland in Chippewa Co.

Porky Point [?GOGEBIC]: location unknown, but presumably not far from Thousand Island Lake (EAB, July 3, 1920; HTD could recall no location when I queried him).

Portage Lake [CRAWFORD]: former name of 1300-acre Lake Margrethe west of Grayling (CFW et al. in 1888; cf. Voss & Crow 1976, pp. 45–47). [There are still about a dozen Portage Lakes altogether in Michigan.]

Portage Lake [LIVINGSTON/WASHTENAW]: E. B. Mains' 1913 collections were made at Gaige's cottage at N end of the lake (Livingston Co.), he once told me.

OAF on June 12, 1921, collected in Dexter Tp., Washtenaw Co. (cf. Pap. Mich. Acad. 2: 22 [1924] and Walpole 1924, p. 36: *Scleranthus*).

Portage Park [MANISTEE]: sec. 21–22, Onekama Tp., *fide* 1926 county map (L. M. Umbach in 1916).

Porter's [OAKLAND]: John Porter's blacksmith shop, Oakland [Tp.] (DC, 1845–1850; cf. his labels for *Agrostis hyemalis* and *Habenaria leucophaea*).

Pottawatomie Lake [BERRIEN]: in New Buffalo.

Pottawatomie Park [BERRIEN]: sec. 21, Hagar Tp. (CKD in 1917).

Pottawattomie Bayou [OTTAWA]: on the Grand River in Grand Haven Tp., SE of Grand Haven (CWB et al.).

Potts' Farm [ALCONA]: N½ NW¼ sec. 2 and NE¼ NE¼ sec. 3, T26N, R5E (CFW et al. in 1888; cf. Voss & Crow 1976, p.27).

Potts' Headquarters [OSCODA]: = McKinley, sec. 15, T26N, R4E (CFW et al. in 1888; cf. Voss & Crow 1976, p. 35).

Powell Lake [OAKLAND]: near Oxford (OAF on Sept. 24, 1924).

Powers, Dr. [MACOMB]: Shelby [Tp.] (cf. DC label for *Mollugo verticillata*).

Pratt Lake [GLADWIN]: T19N, R2W. Of the four lakes bearing this name, in as many counties, the one visited by F. Comte in Aug. 1956 (specimens at MO) must have been the Gladwin Co. one, for the species collected would not have all occurred near any of the other Pratt Lakes.]

Presque Isle [MARQUETTE]: on N side of city of Marquette (Dachnowski in 1906 et al.).

Presque Isle [PRESQUE ISLE]: Lewis Foote's collecting on June 15, 1863, must have been in Presque Isle Co. On June 17 he was collecting at Ephraim, Wisconsin, and he could hardly have gotten there via the Presque Isle in Marquette Co., on Lake Superior.

Preston's Mill Pond [MACOMB]: NE of Disco in Shelby Tp. on Middle Branch of Clinton River (cf. M. A. Leeson, *History of Macomb County* and DC 1840 labels for *Potamogeton amplifolius* and *Myriophyllum heterophyllum*).

Price's Mill Pond [OAKLAND]: Avon [Tp.] (cf. 1872 Oakland Co. plat map and DC 1839 labels for *Sagittaria cuneata* and *Ceratophyllum demersum*—or Oakland [Tp.] (cf. 1839 label for *Elodea canadensis*). [Avon Tp. was separated from Oakland in 1835.]

## Q

Quanicassee [BAY/TUSCOLA]: R. R. Dreisbach collected here (as "Quanticasse") May 22, 1927, and Sept. 6, 1931. He labeled all his specimens as from Bay Co.; however, in his field notes he corrected nos. 5491–5499 and 7598–7602 to Tuscola Co. He left 5500–5504 and 7603–7605 as Bay Co. This distinction is also borne out by his exchange records. So it seems clear that he became aware of the proximity of the county line to this Tuscola Co. community. (Nos. 6192–6208, Aug. 26, 1928, are all unchanged as recorded, for Tuscola Co.)

Quincy Mine [HOUGHTON]: on NE side of Hancock. Quincy Hill here is the classic site for *Juncus inflexus* in Michigan; cf. Rhodora 43: 633 (1941) and Pap. Mich. Acad. 30: 59 (1945). [Neither should be confused with the village of Quincy in Branch Co., where B. B. Kanouse collected.]

## R

Rabbit Bay [HOUGHTON]: (OAF 1943).

Ramona Park [KENT]: on Reed's Lake, Grand Rapids, ca. 1900–1950 (cf. Chronicle 24(2): 5–6, July–Aug. 1988). [Not to be confused with Ramona Park, a settlement and old RR stop in Little Traverse Tp., Emmet Co.]

Randall Swamp [WASHTENAW]: Ypsilanti (OAF 1943).

Rattlesnake Island [WAYNE]: in Detroit River (cf. Beacon 18(4): 4, Winter 2000–01). [Now known as Belle Isle (cf. under Hog Island, above) and not to be confused with Rattlesnake Island in western Lake Erie, Ottawa Co., Ohio.]

Redberry Lake [MARQUETTE]: on Longyear Tract (q.v.).

Reese's Bog (Swamp) [CHEBOYGAN]: cedar swamp at the north end of Burt Lake (UMBS).

Reform School [INGHAM]: at Lansing, later called the Industrial School for Boys (cf. Wheeler in 1892, *Carex lupuliformis*).

Reserve [MACOMB]: Washington [Tp.] (cf. DC labels for *Glyceria striata, Carex cephaloidea, C. laxiculmis, C. grayi*, etc.).

Resolute [KEWEENAW]: (OAF 1943).

Rice Lake [HOUGHTON]: near eastern border of Keweenaw Co. (OAF).

Rockport [ALPENA]: sec. 6, T32N, R9E (cf. letter in Mich. History 65(5): 4, Sept.–Oct. 1981).

Rogers Creek [VAN BUREN]: (Nieuwland in 1919; cf. one of his collections of *Taxus canadensis*, ND).

Rosedale [EMMET]: E edge of Petoskey, at Bay View (cf. 1902 plat map—and current street sign). [Note that there was also a Rosedale in Chippewa Co., from which I have seen no collections.]

Roth, Camp Filibert [IRON]: on W side of Golden Lake, sec. 26, T44N, R37W (Univ. of Michigan forestry camp, originally established in 1929 in Alger Co., W of Munising, but moved in June of 1935 to Golden Lake; property sold in the 1990s).

Ruby's [MACOMB]: Elisha Ruby's, Shelby [Tp.] (cf. 1851 DC label for *Polygonum punctatum*). [Not the same as Ruby in Clyde Tp., St. Clair Co.]

## S

Saginaw Forest [WASHTENAW]: 80-acre tract in sec. 26, T2S, R5E, planted (starting in 1904) with diverse trees and including Third Sister Lake; administered by the University of Michigan School of Natural Resources and Environment

(originally named "The Saginaw Forestry Farm" as requested by the donor of the land, Arthur Hill of Saginaw, but not situated in Saginaw. The name was changed in 1919 to "The Saginaw Forest.").

Sailors Encampment [CHIPPEWA]: near the S end of Neebish Island, in the St. Mary's River (not the entire island as indicated by Romig). (E. T. & S. A. Harper collected here in 1897 and 1898.)

St. Clair Flats [ST. CLAIR]: at mouth of St. Clair River, in Lake St. Clair; long dredged to accommodate navigation (old maps, history, etc., in Beacon 19(4), Winter 2001–02).

St. Joseph [BERRIEN]: Caution! Note that this city in Berrien Co. is 35 and more miles from St. Joseph Co.—but some 1837 First Survey labels confuse the issue by omitting "Co." (cf. McVaugh 1970, p. 243).

St. Martin Island [DELTA]: in Lake Michigan S of Garden Peninsula, just before the Wisconsin line. (For history of collecting, cf. Judziewicz, Mich. Bot. 40: 139–140. 2002 ["2001"]). [Not to be confused with the St. Martin Island in St. Martin Bay north of Mackinac Island, in Mackinac Co.]

Salmon Trout River [HOUGHTON]: mouth on Lake Superior near Redridge (Lewis Foote in 1865; cf. also Lt. Allen's 1832 mention [Mason 1958, p. 179]).

Salmon Trout River [MARQUETTE]: this one flows into Lake Superior at Salmon Trout Bay west of Salmon Trout Pt., and is perhaps better known than the preceding, which was early called "Little" Salmon Trout (cf. Peters in Mich. Academician 18: 412. 1986).

Sand Bay [KEWEENAW]: (OAF 1943; "Great Sand Bay" is between Eagle River and Eagle Harbor).

Sand Lake [?JACKSON or KALAMAZOO]: "8 or 10 miles from the village of Jacksonburgh" [original name for Jackson] (J. Wright in 1838 on label for *Eleocharis equisetoides*, NY). [There are over 20 other Sand Lakes in Michigan—but Humphrys does not include this one.] On the other hand, McVaugh (1970, p. 243) notes a "Sand Lake" 8 or 10 miles from Kalamazoo mentioned in a letter from John Wright (botanist with the First Survey) to John Torrey; this would accord with "Sandy Lakes" on old maps in the Austin Lake area.

Sands [MARQUETTE]: station on the Chicago & Northwestern RR 13 miles SE of Negaunee; presumably this is the "Sands" of A. Dachnowski in 1906 (and not the village of Sands ca. 3 miles to the north—neither, however, in the Marquette Quadrangle, which Dachnowski surveyed). [Named for Louis Sands, not for the dry sandy plains there, as described by Dachnowski in Rep. Mich. Acad. 9: 94. 1908.]

Sawmill Creek [HOUGHTON]: flows into Torch Lake E of Lake Linden (OAF 1943). [There is also a Sawmill Creek in Chippewa Co. just N of Paradise and doubtless are others.]

School Girl's Glen [WASHTENAW]: (sometimes abbreviated on labels "S. G. G.") ravine S of Huron River and N of Forest Hill Cemetery, Ann Arbor, now in W part of Nichols Arboretum; designation once more broadly applied to the whole Arboretum area (cf. A. D. Tinker, "The birds of School Girl's Glen, Ann Arbor, Michigan: A study in local ornithology," Mich. Geol. Biol. Surv. Publ. 1, Biol Ser. 1: 35–66 + 4 pl. + folded map. 1910).

Schoolcraft [KALAMAZOO]: Caution! Note that the village of this name is hundreds of miles from Schoolcraft County in the Upper Peninsula.

Scotty Bay [MACKINAC]: on W side of Beavertail Point in sec. 4, T41N, R2E, E of Les Cheneaux on north shore of Lake Huron (Erlanson in 1924 et al.).

Scranton's [MACOMB]: G. W. Scranton's, Washington [Tp., sec. 27] (cf. DC 1844 label for *Echinochloa walteri*; "Scranton Marsh" [*Eleocharis erythropoda* in 1847 and *Carex lacustris* in 1843] presumably the same).

Sedge Pt. [CHEBOYGAN]: N shore of Douglas Lake just W of North Fishtail Bay (UMBS).

Seneca Lake [KEWEENAW]: ca. 1 mile NW of Mohawk (OAF 1943; the only lake of that name in Michigan *fide* Humphrys).

Shaffer's farm [KALAMAZOO]: sec. 34, Schoolcraft Tp. (CRH, cf. his 1934 label for *Juglans cinerea*).

Shaffer's woods and marsh [KALAMAZOO]: NE of Goose Lake, Schoolcraft Tp. (CRH, cf. his label for *Cornus canadensis* and his *Flora* for *Panicum tsugetorum* and *Quercus ellipsoidalis*).

Sharon Hollow [WASHTENAW]: mostly in sec. 29, Sharon Tp.; now the Nan Weston Preserve of The Nature Conservancy.

Shaw [MACOMB]: Marvil Shaw, Washington Tp. (DC in 1841).

Shelby [MACOMB]: the township (T3N, R12E) in Macomb Co. is immediately south of Washington (where Dennis Cooley and William A. Burt lived). [It should not be confused with the village of Shelby (in another Shelby Tp.) in Muskegon Co. on the opposite side of the state.]

Shelbyville [ALLEGAN]: (OAF in 1920 and 1923; his notes and original labels say Kalamazoo Co.—presumably a carry-over from Galesburg, where he was immediately before—but his 1943 manuscript says Allegan Co.)

Sheldon Sawmill [MACOMB]: (DC, presumably sec. 16, Ray Tp., on Clinton River).

Shelter Bay [ALGER]: west of Au Train Bay (Lewis Foote in 1867).

Sherman [ST. JOSEPH]: = Sturgis (and Sturgis Prairie) (First Survey in 1837; cf. McVaugh 1970). [There a number of other "Sherman" sites in Michigan; cf. Romig.]

Shot Point [MARQUETTE]: on Lake Superior just W of Alger Co. line.

Silver Creek (or River) Meadow [KEWEENAW]: (OAF 1943).

Silver Mt. [HOUGHTON]: (OAF 1943).

Sister Lakes [VAN BUREN]: in the SW corner of Van Buren Co. (with Crooked Lake barely into northern Cass Co.) (L. M. Umbach in 1915 et al.). [Not to be confused with First, Second, and Third Sister Lakes in and near Ann Arbor, Washtenaw Co.]

Skelton's bog [HILLSDALE]: W side of Montgomery (*fide* F. W. Case in conversation 1989).

Sleeping River [ONTONAGON]: East and West Sleeping rivers empty into Sleeping Bay between Wolf Pt. and Fourteen Mile Pt. in eastern Ontonagon Co. (cf. Peters in Mich. Academician 18: 417. 1986).

Slocum's Island [WAYNE]: now incorporated in Trenton (Elizabeth Park) at the bridge to Grosse Isle in the Detroit River (cf. Romig and 1906 topo map for Wyandotte Quad.).

Smelts Incline [HOUGHTON]: (OAF 1943).

Smith huckleberry marsh [KALAMAZOO]: sec. 32, Portage Tp. (cf. CRH 1934 label for *Gentiana alba*).

Smith's Bog [CHEBOYGAN]: S of Green Star Trail in sec. 35, T37N, R3W (UMBS).

Soldiers' Home [KENT]: built in 1886 in sec. 6, Grand Rapids Tp., now incorporated in the northern part of the city—formerly 3 miles from town; a frequent collecting site for late 19th century botanists incl. EJC; cf. Mich. History 82(4): 100, July–Aug. 1998, and, with view of the woods, 70(3): inside cover, May–June 1986).

Southerland's [MACOMB]: Silas Southerland's, Shelby [Tp.] (cf. DC 1840 label for *Aster lanceolatus*).

Spring Lake [OTTAWA]: J. A. Drushel collected here in 1919 (specimens, MO). [But in 1931 he collected at a Spring Lake in New Jersey (cf. his label for *Hypochaeris*).]

Springwells [WAYNE]: community (north of Ecorse and east of Dearborn) and later township now incorporated in Dearborn; in 1835 Bela Hubbard (Douglass Houghton's assistant in the First Survey 1837–1845 and a prominent citizen of Detroit) acquired a farm here from which First Survey plants labeled "Springwells" very probably came.

Spur 447 [CHIPPEWA]: on Soo Line RR. ca. 2.5 miles W of Trout Lake.

Spur 459 [CHIPPEWA]: on Soo Line RR ca. 9 miles E of Trout Lake. [According to "Tales & Trails of Tro-La-Oz-Ken" (a 1976 local history of the Trout Lake area), p. 85, Spur 459 was once a community of 100 persons, had a P.O. 1910–1915, and was "one mile south of Ozark"—that location apparently erroneous (it would better locate Kenneth).]

Squaw Island [WAYNE—if not Ontario, Canada]: location unknown (McVaugh 1970, pp. 237 and 243) but quite possibly = Mama Juda Island (q.v.) "named from an old squaw" (Farmer p. 7) (First Survey in 1837; cf. label on *Lysimachia thyrsiflora*). [Since the label, in the hand of Bela Hubbard, Houghton's assistant, says "Detroit River" presumably this was not the tiny Squaw Island shown on the old Maumee Bay topo quadrangle (surveyed in 1899) between the south ends of Indian Island and Guard Island on the north side of Maumee Bay, Monroe Co. Neither of these need be confused with the Squaw Island in northern Lake Michigan, in the Beaver group (Charlevoix Co.).]

Squirrel Isl. [Lambton Co., Ontario, Canada, in mouth of St. Clair River.]

Star [OAKLAND]: (OAF 1943).

Star Island [ST. CLAIR]: in St. Clair Flats, Lake St. Clair (A. B. Lyons in 1877; cf. his label for *Carex rostrata* and Chronicle 27(1–2): 26. 1993). "Star Island Cut" was between two of the islands near end of S. Channel Dr., just NW of International border (cf. old maps of the Flats, e.g. as in Beacon 19(4): 13, Winter 2001–02).

Stead's [MACOMB]: Shelby [Tp., sec. 33] (DC in 1850; cf. his label for *Potamogeton amplifolius*).

Steele farm [MACOMB]: Ray [Tp.] (DC).

Stevens [OAKLAND]: apparently near Farmington (OAF and CB collected here July 14, 1918, and CB at "Stevens Corners" Sept. 14, 1916. [It was here (in a private woods) on May 19, 1917, that OAF collected the variable trilliums described in Rep. Mich. Acad. 20: 155–159. 1919. OAF, CB, and J. H. Ehlers were in the woods again to examine the trilliums and other plants May 8, 1927.]

Stevens farm [MACOMB]: Shelby [Tp.] (cf. 1840 DC label for *Aster dumosus*).

Stewart Lake [MUSKEGON]: (C. D. McLouth on June 26, 1900 [*fide* label on *Panicum boreale*, MSC]; CFW collected here the same date (*Panicum commonsianum* and *P. implicatum*; no such lake is indexed by Humphrys).

Stones [MACOMB]: A. Stones, Washington [Tp., sec. 13] (DC in 1847, cf. label for *Carex lanuginosa*).

Stoney Creek [MONROE]: the electric interurban station was 4 mi SW of Newport (Mich. Man. 1905, p. 269); the creek itself crosses much of the county. OAF walked from Monroe along the tracks to Stoney Creek June 9, 1921 (cf. his field notes and Am. Midl. Nat. 11: 46 etc. 1928); he also collected at this Stoney Creek Aug. 17, 1927. [Of course there are Stoney/Stony Creeks in a number of other Michigan counties.]

Stony Creek [OAKLAND]: vicinity of Rochester, Avon Tp. OAF collected here (the creek flowed through Parkedale in sec. 12; cf. Pap. Mich. Acad. 15: 150. 1914). DC also collected at Stony Creek marsh (E border in Avon [Tp.], cf. his 1843 label for *Scirpus hudsonianus* and also 1847 label for *Salix eriocephala*); however, DC 1848 label for *C. crawei* on "bank of Stony Creek marsh" is attributed to Washington [Tp., Macomb Co.]. (On Stony Creek history, including Van Hoosen farm, see Mich. History 62(3): 18–36, Sept–Oct. 1978 and 79(5): 53–55, Sept.–Oct. 1995.)

Sugarloaf Lakes [KALAMAZOO]: area ca. 3 miles N of Schoolcraft (CRH).

Sugarloaf Mt. [MARQUETTE]: sec. 32, T49N, R25W. [Do not confuse with the well known "Sugarloaf" rock on Mackinac Island.]

Sullivan's Woods [GRATIOT]: near Alma, W½ sec. 32, T12N R3W.

Superior [WASHTENAW]: (OAF in 1927).

Swamp [HOUGHTON]: "The Swamp," a *Chamaedaphne* bog 0.5 mile N of Laurium (FJH coll here; cf. letter from him to EGV April 10, 1969).

Sweeney's's woods [ISABELLA]: now a subdivision in sec. 6, T14N, R4W (*fide* G. Starks; some specimens in CMC erroneously locate this woods).

# T

Tacoma [MACOMB]: I have been unable to locate this site where OAF collected his nos. 4263–4274 July 2, 1916, attributing them to Macomb Co. in his field notes and in some published citations, but without further information. He collected at no other place that day, and the collections include both upland and fen species.

Taylor's Hill [JACKSON]: Waterloo Tp. (cf. CFW 1898 label, GH, for *Carex bicknellii*).

Third Sister Lake [WASHTENAW]: sec. 26, T2S, R5E, in the University of Michigan's Saginaw Forest (q.v.).

Third Woods [WASHTENAW]: (J. Romein in 1915 et al.); sec. 9, Pittsfield Tp. (cf. FJH field notes for his 6833, *Festuca obtusa*, July 1, 1935; at that time "3 mi. S. of" Ann Arbor; now within the city limits (and including present site of the University Herbarium).

Thomas Bog/woods [WASHTENAW]: SE¼ sec. 22, Pittsfield Tp.; now included in the Pittsfield Preserve (of the township of the same name). (Ruth B. [Alford] MacFarlane coll. and pers. com. 2002; cf. also Cady's, above.)

Thompson [MACOMB]: Nehemiah Thompson's, Washington [Tp.] (cf. DC 1852 label for *Salix sericea*).

Thorps meadow [MACOMB]: Shelby [Tp.] (cf. DC labels for *Carex debilis* and *C. scoparia*).

Thurston [MACOMB]: D. Thurston's land, Washington [Tp.] (cf. DC 1837 label for *Euthamia graminifolia*).

Towar Swamp [INGHAM]: "1.5 miles n. of Agr'l College" (CFW label for *Carex tenuiflora*; one for *Habenaria ciliaris* reads "near the Agr'l College"). Towar Gardens is shown on the 1933 soils map in S½ sec. 6, T4N R1W, just N of East Lansing and SE of Chandler Marsh (q.v. above).

Tower [CHEBOYGAN]: village (est. 1899) and dam site on the Upper Black River in T34N, R1E. [A town in St. Louis Co., Minnesota, bears the same name and is the site for an 1889 EJH collection of *Caltha natans*, which has sometimes been erroneously (and anachronistically) attributed to Michigan because of misreading a handwritten label.]

Townsend Marsh [OAKLAND]: Oakland [Tp.] (DC 1837 label for *Carex tetanica*; however, on an 1840 label for *Solidago patula* he crossed out "Oakland" and wrote in "Washington" [Tp., Macomb Co.]; on some other 1840 and 1847 labels he has merely "Washington" (the 1859 plat has no Townsend property in Washington Tp.). On his label for an 1840 collection of *Zizania aquatica*, he wrote "Townsend pond on the line of Washington–Oakland," so he obviously was aware of the county line.

Traine Island [ALGER] = Au Train I. (Gillman in 1867; similarly, "Traine Bay"—both on Lake Superior west of Munising and Grand Island).

Trap Rock River [HOUGHTON]: flows into N end of Torch Lake (OAF 1943).

Traverse Bay [ANTRIM/GRAND TRAVERSE]: Mary Clark was here in 1869 at Elk Rapids [Antrim Co.] on Grand Traverse Bay (cf. her label for *Utricularia cornuta*); she was also at Traverse City [Grand Traverse Co.] in 1869. CFW collected at the Bay in 1898, often with reference to Traverse City or the Peninsula in the Bay, so presumably his specimens are to be referred to Grand Traverse Co. and not to Leelanau or Antrim counties, which also border the Bay. [There is also a Grand (or "Big") Traverse Bay on the Keweenaw/Houghton Co. line. Cf. also Little Traverse Bay, above.]

Trowbridge [CHEBOYGAN]: (CFW July 13, 1890; cf. his label for *Carex bebbii*). [N.B.: on July 12 CFW collected near Bay View in Emmet Co.; but on July 11 he collected in Ingham Co.—where there was another Trowbridge at the junction of the Pere Marquette and Grand Trunk railroads south of East Lansing (cf. Foster 1942, p. 513).]

Twin Falls [DICKINSON]: on Menominee River, sec. 7, T40N, R30W and sec. 12, R31W (CAD in 1905; cf. p. 226 in his report on peat in Rep. Geol. Surv. Mich. for 1906).

Twin Lakes [HOUGHTON]: (OAF on Aug. 15, 1934; cf. his label for *Carex paupercula*). [Of course, there are many other Twin Lakes in the state.]

Tyrone [LIVINGSTON]: Tyrone Tp., NE corner of the county (OAF on June 10, 1930) [but note that there is also a Tyrone Township in Kent Co., where others have collected].

## U

Upham's clearing [MACKINAC]: sec. 27, Bois Blanc Island (M. T. Bingham in 1939; cf. her label for *Monarda fistulosa*).

Upper Peninsula Experiment Station (Chatham) [ALGER]: SE¼ sec. 28, T46N, R21W.

## V

Vaughnsville [KEWEENAW]: (OAF 1943; cf. also Romig 1972).

Veit's woods [ISABELLA]: a property of Central Michigan University in sec. 21, T14N, R4W (*fide* G. Starks; some specimens in CMC erroneously locate this woods).

Vestaburg Bog (Vestaburg Ecological Station) [MONTCALM]: sec. 34, T12N R5W (CAD et al., ALMA); now in the MacCurdy Ecological Tract (q.v.).

Vestal's Bog [CHEBOYGAN]: S of Livingston Bog in sec. 35, T37N, R3W (UMBS, cf. map in Nelson 1956).

Vulcan [KEWEENAW]: triangulation station on East Bluff (near SE corner sec. 1, T58N, R28W), established by the U. S. Lake Survey in 1866 for primary triangulation of Lake Superior (cf. Voss 1978, p. 52).

## W

Walpole Island: [Lambton Co., Ontario, Canada, at mouth of St. Clair River.]

Warners Sawmill [OAKLAND]: Troy [Tp.] (cf. DC 1850 label for *Erigenia bulbosa*).

Warren's [MACOMB]: Elder Abel Warren's, Shelby [Tp.] (cf. DC 1840 label for *Muhlenbergia schreberi* and 1845 label for *Lactuca biennis*).

Water Works [OAKLAND]: Rochester, sometimes abbreviated by OAF on his labels as "R.W.W.", N½ sec. 4 (cf. map p. 2 and endpapers in Eula Pray, *History of Avon Township*, 1986).

Water Works [WAYNE]: on Detroit River opposite Belle Isle (OAF Sept. 24, 1900; cf. his label for 1681, *Sporobolus neglectus*, cited Am. Midl. Nat. 10: 24. 1926; again on Sept. 18, 1901, cf. his label for 1758a, *Paspalum setaceum*, and cf. Farmer, pp. 67–69).

Waterford [WAYNE]: between Plymouth and Northville, in Northville Tp. (OAF on April 30, 1929, nos. 8297–8306). [Not to be confused with the better known Waterford (Tp.) in Oakland Co.]

Watkins Station [JACKSON]: (A. B. Lyons in 1874; CFW in 1892, cf. his labels for *Panicum flexile* and *Allium cernuum*; cf. also Romig).

Wawatam Beach [EMMET]: erroneously assigned to Cheboygan Co. by Romig but is entirely west of the county line in the village of Mackinaw City (q.v.).

Webb's Woods [WASHTENAW]: NW¼ sec. 22, Pittsfield Tp. (Ruth B. [Alford] MacFarlane coll. and pers. com. 2002).

Webster Farm [probably Washington Tp., MACOMB]: (DC in 1839, cf. label for *Trisetum melicoides*; Daniel Webster was first constable, then treasurer in 1827; another Webster has land in sec. 13 on the 1859 plat map).

Wellman's Swamp [INGHAM]: at the Agricultural College (W. R. Kedzie in 1895; cf. his label for *Poa paludigena*).

West Bluff [KEWEENAW]: now identified (if at all) on maps as "Brockway Mt.," on Brockway Mountain Drive ca. 3 miles W of Copper Harbor. [The Michigan Audubon Society and the Michigan Nature Association have sanctuaries here; classical site for rare plants, including western disjunct species, since the days of O. A. Farwell and M. L. Fernald.]

West Bridge St. Ferry [OTTAWA]: west of Grand Rapids, sec. 20, Tallmadge Tp. (EJC).

West Lake [EMMET]: = Dow Lake = western of the Twin Lakes, in sec. 12, T38N, R4W (Carp Lake Tp.—not Wawatam Tp. as indicated by Nelson) (UMBS).

Wetmore Pond [MARQUETTE]: NE¼ sec. 31, T49N, R25W. [Not at village of Wetmore in Alger Co.]

Wheal Kate [HOUGHTON]: SE¼ sec. 18, T54N, R34W, ca. 1 mile S of South Range (cf. 1915 topo map for Houghton quad.).

White, Peter: See Peter White's Camp, above.

Whitefish Bay: Henry Gillman and Lewis Foote collected in 1866 at Whitefish Bay, Door Co., Wisconsin, on Lake Michigan—not in Michigan at the well-known Whitefish Bay on Lake Superior. [A Whitefish Pt. is also on the S side of Whitefish Bay, Wisconsin.]

Whitefish Lake [MACKINAC]: (Mrs. Calvin Goodrich in August, 1922, and presumably also B. E. Quick the same summer). [There are also several other Whitefish Lakes in the state.]

Whitefish Point: Besides the well known site on Lake Superior (Chippewa Co.), note that there is another Whitefish Point on the W side of Prentiss Bay in Mackinac Co., just E of Les Cheneaux (Ehlers & Erlanson in 1924; Voss in 1983). There is also a Whitefish Point across Thunder Bay, E of Alpena, on Whitefish Bay (Alpena Co.).

Whitehouse Nature Center [CALHOUN]: 125 acres on E Branch of the Kalamazoo River, ca. one quarter mile SE of the main campus of Albion College, which owns and administers it.

Whitmore Lake [LIVINGSTON/WASHTENAW]: on the county line. (OAF on July 20, 1927, nos. 8006–8019, was apparently on the Washtenaw Co. side [cf. his label for *Lilium michiganense*] and likewise Sept. 5, 1923, nos. 6173–6176 [cf. his field notes]; he was at the north end, in Livingston Co., on June 15, 1927, nos. 7948–7967 [cf. his field notes]).

Wiard [WASHTENAW]: station on the Michigan Central RR near SW corner of sec. 1, Ypsilanti Tp. (cf. topo map for Ypsilanti quad, 1906 ed.). OAF frequently collected here and doubtless explored some distance from the station. A pioneer family, the Wiards moved from New York to Michigan in 1830 and settled on Wiard Road, founding Wiard Orchards in 1853. [In 1943 the Wiards moved their business to Merritt Rd. having sold the original site for industrial and expressway (now Interstate 94) development (cf. www.wiards.com).].

Wilcox farm [MACOMB]: Elias Wilcox, NE¼ sec. 3, T3N, R12E [Shelby Tp.] (*fide* DC 1844 label for *Lithospermum arvense*).

Willey's [MACOMB]: "along the north branch of the Clinton" (cf. DC 1840 label for *Monarda didyma*; presumably sec. 27, Ray Tp., where Willey land is shown on the North Branch on 1859 and 1875 plat maps).

Windmill Pt. [WAYNE]: Grosse Pte., at source of Detroit River; lighthouse built here in 1838, subsequently rebuilt and replaced (cf. Beacon 18(4): 5–6. 2001–02).

Wolf Lake [JACKSON]: at the junction of Grass Lake, Leoni, and Napoleon Tps.; this is the site for collections by S. H. & D. R. Camp in the 1890s (as well as by others); and for *Besseya bullii*. The Wolf Lake in Lake Co. (7 miles N of Baldwin) and the one in northeastern Delta Co. are both noted for plants of Coastal Plain affinity. There are more than 20 other Wolf Lakes in Michigan.

Wolff's Bog [CHEBOYGAN]: secs. 14 and 15, T37N R3W (UMBS).

Woodbridge Park [WAYNE]: Dearborn (cf. OAF label for *Sphenopholis intermedia*, BLH).

Woodlawn Cemetery [WAYNE]: Detroit, just south of Oakland Co. line and Ferndale.

Woodville [NEWAYGO]: (OAF on Aug. 4, 1921).

Woodward at Lacy [OAKLAND]: (CB).

## Y

Yates Cider Mill [MACOMB]: NW of Utica (cf. Mich. Hist. 81(4): 42, July–Aug. 1997).

## Z

Zug Island [WAYNE]: Detroit River at mouth of Rouge River; originally a marshy peninsula, later isolated by a ship channel and heavily industrialized (cf. Mich. History 87(6): 59, Nov.–Dec. 2003).

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Contr. Univ. Michigan Herb. 24: 227–228. 2005.

# SCINAIA ACUTA, A NEW NAME PROPOSED FOR SCINAIA AUSTRALIS (RHODOPHYTA)

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In his monographic treatment of Australian representatives of *Scinaia*, Huisman (1985) offered persuasive evidence for the merger of the genera *Pseudoscinaia* and *Pseudogloiophloea* with *Scinaia*. This taxonomic treatment resulted in a number of transfers of names into *Scinaia*. One such transfer effected was *Scinaia australis* (Setch.) Huisman, based on *Pseudoscinaia australis* Setch. (Setchell 1914). This binomial has been accepted in several floristic accounts, such as Millar (1990), Millar and Kraft (1993), and Womersley (1994). The species has also been reported as present in the Canary Islands (Reyes et al., 1993; Haroun et al. 2002). It is listed as an accepted taxon in the on-line AlgaeBase (Guiry & Nic Dhonncha 2003). Yet, *Scinaia australis* of Huisman is an illegitimate name, a later homonym of *S. australis* (Sond.) Trevis. (Trevisan 1848). Therefore, a new name is proposed.

**Scinaia acuta** M. J. Wynne, nom. nov. *Pseudoscinaia australis* Setch., Univ. Calif. Publ. Bot. 6: 121, fig. 62, 1914. *Scinaia australis* (Setch.) Huisman, Phycologia 24: 417. 1985, non *Scinaia australis* (Sond.) Trevis., 1848.

The epithet *acuta* alludes to the acutely pointed apices of the branches in both young and mature specimens, a feature stated to be consistent and distinctive for this species (Huisman 1986).

When discussing taxonomic relationships of his *Scinaia australis*, Huisman (1986) stated that among possibly related species "only *S. verae* (Dickinson) Huisman approaches the thallus dimensions of *S. australis.*" He distinguished this pair of species on the basis of branch diameters; those of his *S. australis* rarely reach 2 mm, whereas those of *S. verae* reach 2.75 mm. Dickinson (1951) described her species from Prampram, Gold Coast [Ghana], and it appears to be endemic to that area of tropical West Africa (Lawson & John 1987; Woelkerling et al. 1998).

*Scinaia australis* (Sond.) Trevis. is currently treated as a taxonomic synonym of *Nizymenia conferta* (Sond.) Chiovitti, G. W. Saunders & Kraft in Chiovitti et al. (1995). Earlier, Silva (1950) had recognized *Stenocladia australis* (Sond.) P. C. Silva, based on *Ginannia australis* Sond. (Sonder 1845). The merger of *Stenocladia* with *Nizymenia* proposed by Chiovitti et al. (1995) led to the proposal of *N. conferta* in their paper.

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# TWO NEW SPECIES OF BRYOPSIS (ULVOPHYCEAE, CHLOROPHYTA) FROM THE SULTANATE OF OMAN, WITH A CENSUS OF CURRENTLY RECOGNIZED SPECIES IN THE GENUS

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ABSTRACT. Two new species of the green algal genus *Bryopsis*, *B. nana*, and *B. robusta*, are described on the basis of collections made from Dhofar, Sultanate of Oman. *Bryopsis nana* is of relatively small stature (4–8 mm tall) and has radial branching (to a single order, the branches only 0.5–1.0 mm long). *Bryopsis robusta* is distinguished by its large size (to 11 cm in height and primary axes to 2.0 mm in diameter) and the distichous nature of its branches (to three orders). The new species are known only from southern Oman, a region impacted by the summertime monsoon of nutrient-rich, relatively cold-water conditions. A census of the 47 other species currently recognized as belonging to the genus *Bryopsis*. Full literature citations are provided for all accepted names in *Bryopsis* as well as all doubtful and excluded names. One new combination, *Bryopsis cupressina* var. *adriatica*, is proposed.

## INTRODUCTION

The genus *Bryopsis* Lamouroux (Bryopsidales, Chlorophyta) has a wide distribution in tropical to cool temperate seas. Populations of *Bryopsis hypnoides* J. V. Lamour. occurring at Helgoland in the North Sea have been shown to tolerate water temperatures from 0° to 30° C (Lüning 1984). Not only is a significant morphological diversity recognized in the genus, but a variety of life-history patterns has been demonstrated (Rietema 1970, 1971; van den Hoek et al. 1972; Bartlett & South 1973; Diaz-Piferrer & Burrows 1974; Tanner 1981; Bold & Wynne 1985). Some of these morphological and life-history differences have led to the recognition of segregate genera, such as *Bryopsidella* (Hustede 1964; Rietema 1972, 1975) and *Pedobesia* (MacRaild & Womersley 1974).

Previously, *Bryopsis pennata* J. V. Lamour. (Barratt et al. 1984), *B. maxima* Okamura ex Segawa (Wynne 1999b), *B. plumosa* (Huds.) C. Agardh (Wynne 2001b), *B. hypnoides*, and *B. indica* A. Gepp & E. Gepp (Schils & Coppejans 2003) have been reported from the Sultanate of Oman. A recent treatment of the genus *Bryopsis* occurring in Pakistan, another part of the northern Arabian Sea, by Nizamuddin (1995) reported a somewhat surprising total of 16 species. That total included four newly described species and eight new records for Pakistan. Perhaps it is then not unexpected that intensive collecting of a different region of the northern Arabian Sea, namely, the southern (Dhofar) coast of the Sultanate of Oman, has also revealed the occurrence of two undescribed species of *Bryopsis*. This up-to-now little explored coastline has provided a rich source of previously unknown taxa of benthic marine algae (Nizamuddin & Campbell 1995; Wynne 1998, 1999a, 1999b, 2001a, 2002a, 2002b, 2003a, 2003b, 2003c, 2004; Wynne & de Jong 2002; Schils & Coppejans 2002; Schils et al. 2003). The complex composition of this flora on the Dhofar coast has been attributed in part to the dominating summertime monsoon season with its upwelling associated with decreased water temperatures, raised nutrient levels, and high-energy wave conditions (Wynne 2000, 2004).

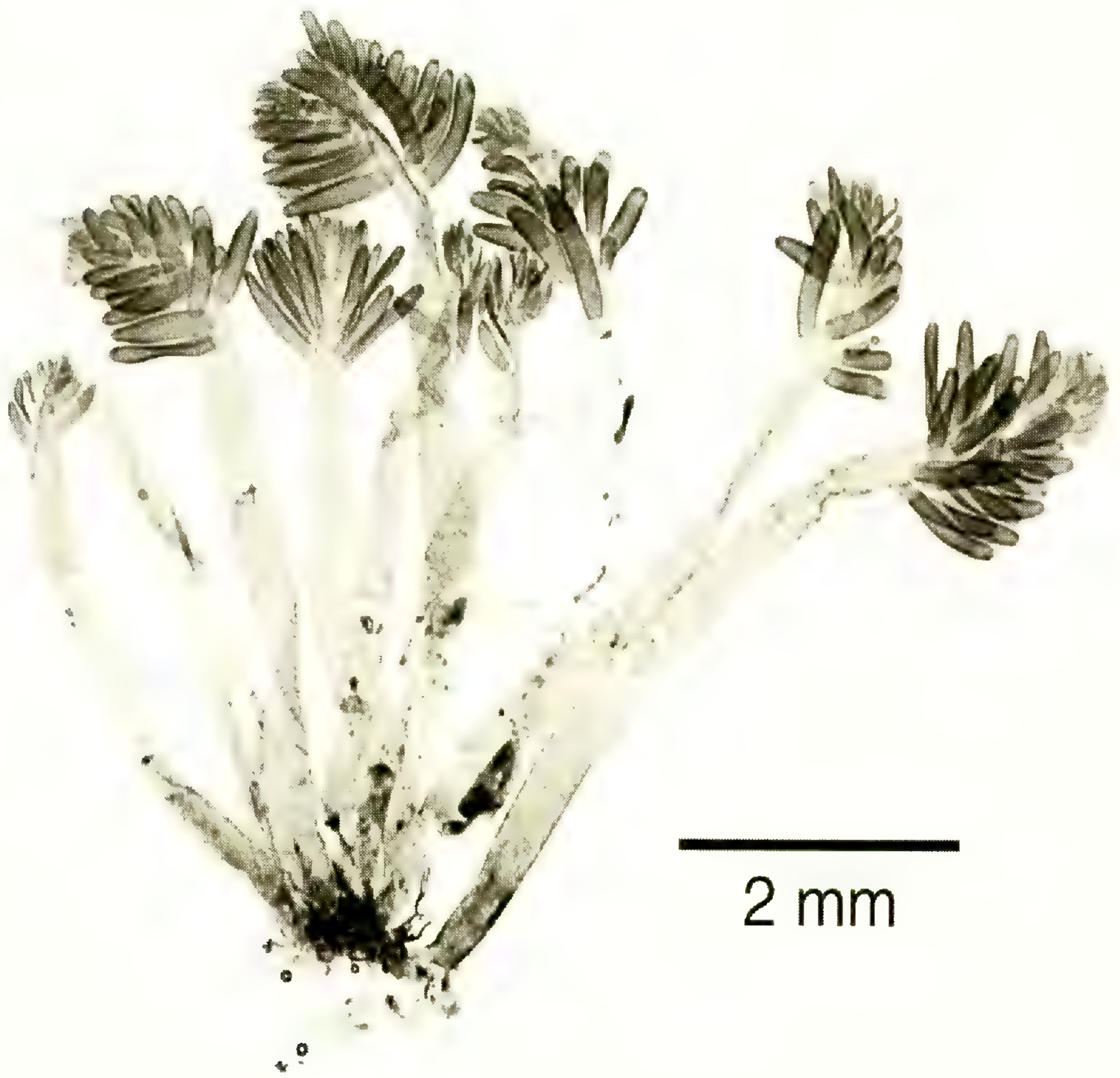


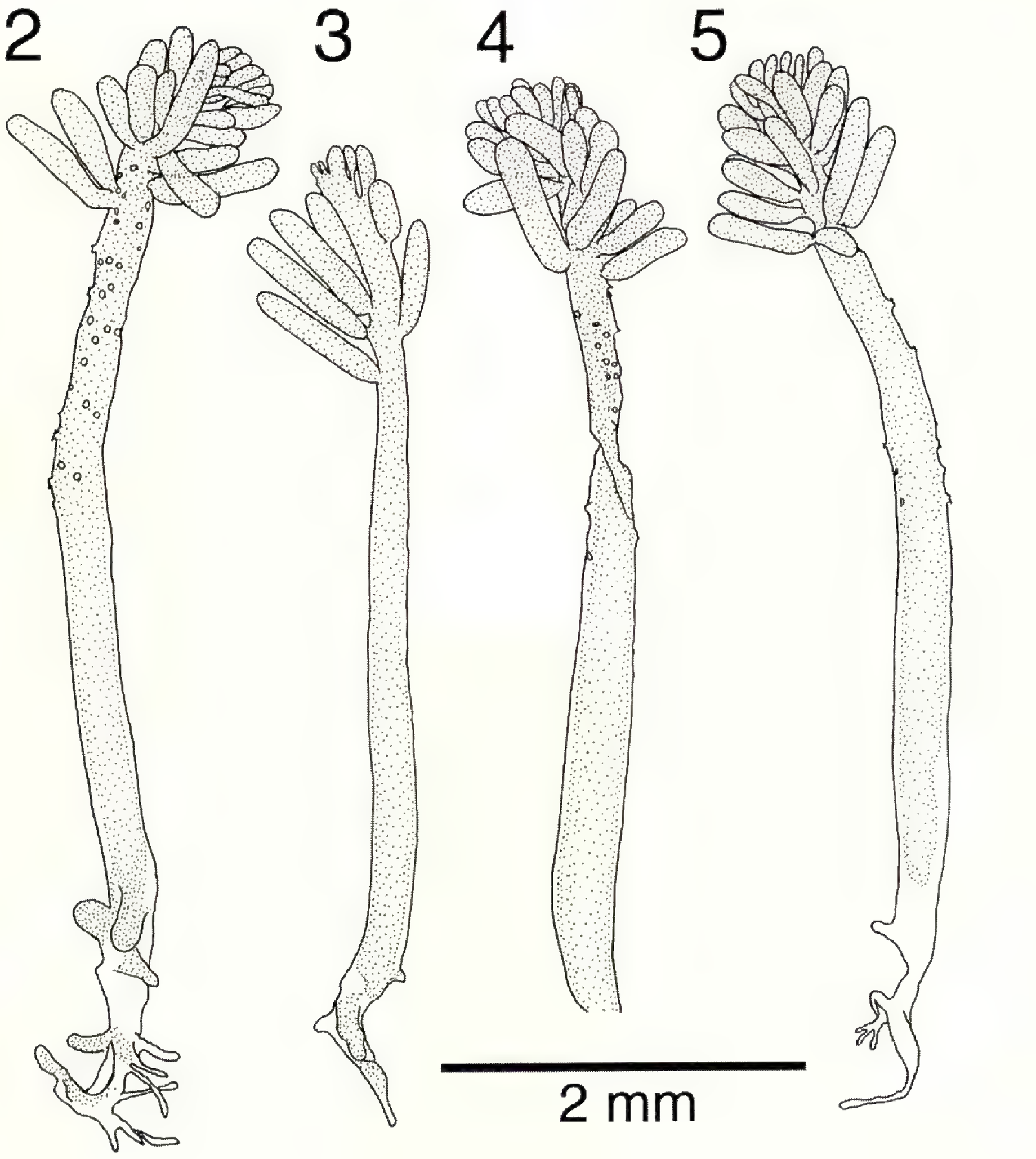

Fig. 1. *Bryopsis nana*. Habit of a typical caespitose cluster of thalli (part of the holotype).

## NEW SPECIES

**Bryopsis nana** M. J. Wynne, sp. nov.—TYPE: SULTANATE OF OMAN. Western side of Wadi Zeid (=Hoon's Bay) (16.94497°N, 54.80402°E), east of Mirbat, Dhofar, 21 Sep 2000, *Tim Collins 21092000-14-02*, epizoic (holotype: MICH!; isotypes: BM! ON!). Figs. 1–5, 9.

Thalli erecti, 5–8 mm alti, axes primarii 315–410 µm in diametro maximo; ramificatio tantum uno ordinis; rami extremo distali axis primario pro parte maxima restricti; rami laterales plerumque 500–780 (–940) µm longi et 150–200 (–260) µm in diam.; shed rami exuti cicatricibus persistentibus in axe primario indicati; cicatrices circa 40–50 µm in diam.; chloroplastae discoideae, 3–4 (–7) µm latae, omnis uno pyrenoide.

The collection consisted of many small thalli removed from the surface of a gastropod shell. The thalli are in tight caespitose clumps (Fig. 1); individual erect thalli reach 5 to 8 mm (Figs. 2–5). Primary axes are 315–410 µm wide in their greatest diameter (above the base) and gradually decrease in diameter distally. Thalli are branched only to a single order, the lateral branches radially arranged and largely confined to the distal ends of the parent axes (Figs. 2–5). The lateral branches are usually 500–780 (–940) µm long and 150–200 (–260) µm in diameter at their mid-point. Scars of shed




Figs. 2–5. *Bryopsis nana*. Examples of primary axes with radial arrangement of branches at distal end (camera-lucida drawings).

laterals are evident along much of the length of the primary axes (Figs. 2–5). Scars measure about 40–50 µm in diameter. Chloroplasts (Fig. 9) are discoidal, 3–4 (–7) µm across, each with a single pyrenoid.

The two most striking characteristics of *B. nana* are its very small size and the radial nature of the branching. The presence of these two character states facilitates our comparison of the new species mainly to those species of *Bryopsis* with similarly small stature and radial branching. Nizamuddin (1995) in his study of *Bryopsis* as occurring on the coast of Pakistan listed a total of 16 species, but only two of those species were said to have radial branching, *B. hypnoides* and *B. corymbosa* J. Agardh. Along with *B. plumosa*, the type of the genus, *B. hypnoides* is one of the most frequently reported species of the genus; it has been reported from Kuwait (Al-Hasan & Jones 1989) and the Gulf coast of Saudi Arabia (De Clerck & Coppejans 1996). Thalli of *B. hypnoides* are typically described as 5–10 cm high (Nizamuddin 1995; Coppejans & Van den heede 1996; Stegenga et al. 1997a; Littler & Littler 2000). Also, branching

in *B. hypnoides* is to more than a single order. These differences easily separate *B. nana* from *B. hypnoides*.

The second species of *Bryopsis* with radial branching reported by Nizamuddin (1995) from Pakistan is *B. corymbosa*. Afonso-Carrillo and Sansón (1999) described the thalli of *B. corymbosa* as having irregular branching and the branchlets forming a terminal plume with a corymbiform aspect, which does resemble thalli of *B. nana*. Agardh (1842) described the fronds of *B. corymbosa* as "minutae, vix bipollicares [= scarcely two inches], caespitosae," and as growing epiphytically on a species of *Codium*. The height of thalli in *B. corymbosa* has been reported as 2–10 cm (Vinogradova 1979), about 2 cm (Børgesen 1925), and 1–2 cm (Feldmann 1937). *Bryopsis pumila* was described by Zanardini (1847) from Venice as caespitose, only 8–10 mm tall, and with densely branched subcorymbose filaments. DeToni (1889) regarded *B. pumila* as scarcely different from *B. corymbosa*, and it was treated as conspecific with *B. corymbosa* by Cammerloher (1915) and Pignatti (1962). Thus, the lower size range of *B. corymbosa* [including *B. pumila*] approximates the height of thalli of *B. nana*. Thalli of *B. corymbosa*, however, have been depicted as having branching to three orders (Kützing 1856, pl. 73, fig. B, as *B. fastigiata*, pl. 81, fig. II; Feldmann 1937). Both Børgesen (1925) and Feldmann (1937) have emphasized the very irregular ramification in *B. corymbosa*. These differences are sufficient to distinguish *B. corymbosa* from *B. nana*.

The characterization of *B. cupressina* J. V. Lamour. by Afonso-Carrillo and Sansón (1999) as having radial branching, axes bearing simple branchlets only in the superior portion of the thalli, and having the lower branches not larger than the upper branches shows similarity to *B. nana*. Yet, branching takes place to two or three orders in *B. cupressina* (Kützing 1856, pl. 79; Funk 1927, fig. 17D; Afonso-Carillo & Sansón 1999), which distinguishes it from *B. nana*. Likewise, the habit of *B. feldmannii* Gallardo & G. Furnari (Gallardo et al. 1993) has radially arranged laterals borne in a terminal tuft (Kützing 1856, as *B. cupressoides*), but that species has two orders of branching and has thalli 4–5 cm in height.

*Bryopsis nana* bears some resemblance to *B. eckloniae*, described as an epiphyte on the kelp *Ecklonia maxima* (Osbeck) Papenf. (Stegenga et al. 1997). This South African species forms expanses several centimeters in diameter, with the primary axes only 5 mm high, and also shows radial branching. Yet, the primary axes in *B. eckloniae* are only to 200 µm in diameter (less than twice the diameter of that in *B. nana*), and branching occurs to two orders, with the branches not distally restricted, as seen in *B. nana*.

*Bryopsis africana* Aresch. is similar to *B. nana* in having densely caespitose thalli usually with polystichously arranged, unbranched pinnules. Also, primary axes are 300–400 µm in diameter (Stegenga et al. 1997). Thalli in *B. africana* attain a height to 5 cm, branching often in short secund series, and the older ramuli produce descending rhizoids covering the primary axes, all features not observed in *B. nana*.

Kützing's depiction (1856, as *B. pennatula*) of *Bryopsis pennata* var. *minor* J. Agardh (1887) shows very small thalli with terminal tufts of laterals, similar to the habit of *B. nana*. Closer scrutiny of Kützing's illustrations shows the primary axes to be branched and the laterals to be distichously arranged. Thus, this taxon does not agree with *B. nana*.

Originally, Womersley (1955) described *B. minor* from southern Australia as having thalli only 2 cm high, but later (Womersley 1984) he expanded the variation to include thalli to 15 cm high. *Bryopsis minor*, which has radial branching, is clearly separable from *B. nana* by its large, bushy habit, its several orders of branching, and the very slender pinnules.

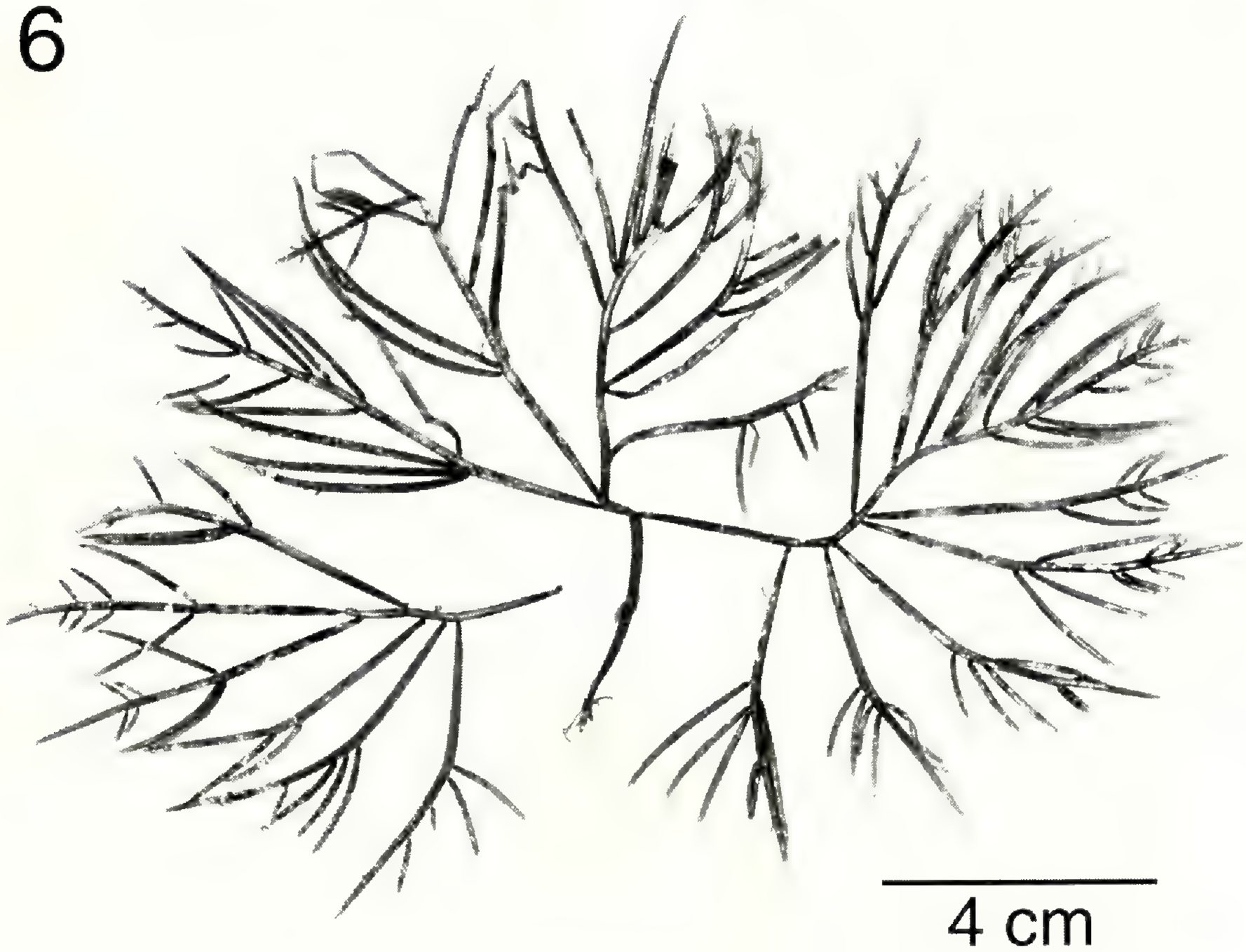


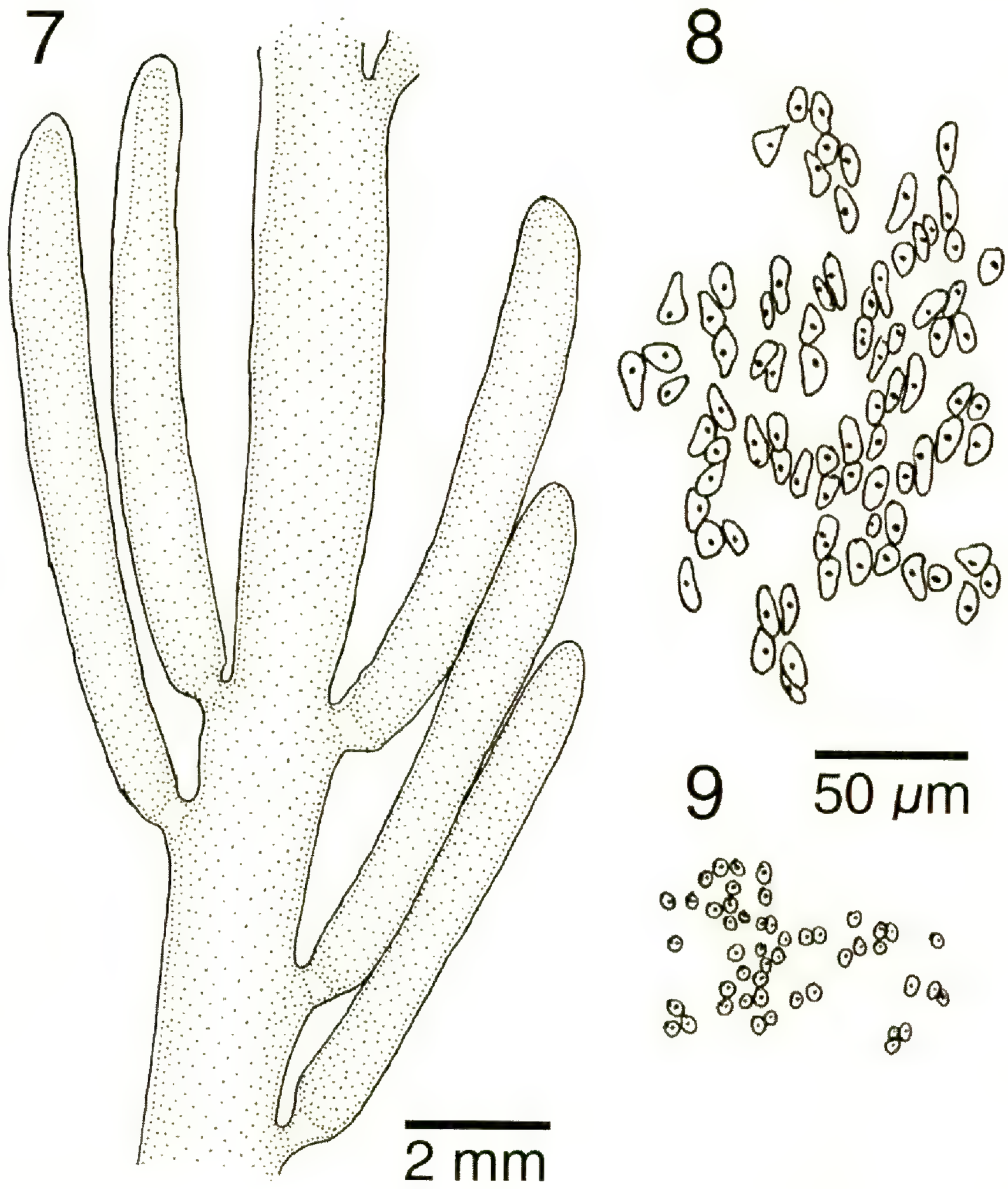

Fig. 6. *Bryopsis robusta.* Holotype (herbarium specimen).

*Bryopsis pusilla*, a small-statured species described by Levring (1938) from South Africa, has branching restricted to a single order with a distichous arrangement. Furthermore, according to Seagrief (1984), *B. pusilla* may merely represent a juvenile stage of *Codium*.

**Bryopsis robusta** M. J. Wynne sp. nov.—TYPE: SULTANATE OF OMAN. Raaha (=Alto) Bay (16.95116°N, 54. 81650°E), E of Mirbat, Dhofar, 15 Sep 2001, *M. Wynne 15092001-10-01*; in drift (holotype: MICH!). Figs. 6–8.

Thallus effusus, 11 cm altus et 16 cm latus, ramis ordinis primi 8–9 cm in longit.; per aliquot rhizoideis basalibus affixus, omne 4–6 mm longum; axis primarius tres ordinibus ramosus; axis ordinis primi et rami ordinis primi et secundi robusti, 1.5–2. 0 mm in diametro; ramificatio dispositione disticha; rami sporadice orientes, non ad intervalla conferta regularia; rami in 1 mm distantia interdum orientes, fortasse in 2.0–3.0 cm distantia interdum orientes; rami ordinis tertii circa 1. 0 mm in diametro, 2.5 mm longi; chloroplastae relative grandes, elongatae, fusiformes, 10–16 μm × 6–10 μm, plerumque uno pyrenoide, interdum duo pyrenoidibus.

This new species is known from only a single specimen (Fig. 6), which is a spreading plant reaching 11 cm in height and 16 cm in width; the first-order branches are 8–9 cm long. Attachment is by means of several anchoring basal rhizoids, each 4–6 mm long. The primary axis is branched to three orders. The primary axis and first- and second-order branches are robust, 1. 5–2. 0 mm in diameter. Branching shows a distichous arrangement (Figs. 6, 7). Branches arise sporadically, not at close, regular intervals. They may arise within a 1-mm distance, but they may also be spaced from




Figs. 7–9. *Bryopsis robusta* and *B, nana.* Fig. 7. Portion of thallus of *Bryopsis robusta*, showing discontinuity of cytoplasm at proximal ends of the branches. Figs. 8, 9. Chloroplasts with pyrenoids of *Bryopsis robusta* (Fig. 8) and *B, nana* (Fig. 9), drawn to same scale. (All are camera-lucida drawings.)

2.0 to 3.0 cm apart. Third-order branches are about 1. 0 mm in diameter and may be up to 2.5 cm long. Chloroplasts (Fig. 8) are relatively large and elongate, spindle-shaped, 10–16 μm by 6–10 μm, usually with a single pyrenoid, sometimes with two.

In terms of its large size, *B. robusta* comes closest to *B. maxima* Okamura ex Segawa (1956), a species previously reported from Oman (Wynne 1999b). A high degree of shared floristic elements between the marine algal floras of Japan and the northern Arabian Sea has been recognized (Børgesen 1934; Wynne, 2000). In order to have a good understanding of the morphological variation in *B. maxima*, the following specimens of Japanese and Omani collections in MICH were examined:

JAPAN. Honshu, Chiba Pref., Choshi-shi: 15. v. 1988, *leg. T. Tanaka* (Algae Marinae et Salsugineae Exsicc. 52). Chiba Pref., Inubozaki, Choshi: 23. v. 1970, *leg. M. Yoshizaki no. 8-008*. Honshu, Shizuoka Pref., Shimoda: v. 1956, *leg. I. Shihira*.—OMAN. Al Hallaniyat Islands, southeast bay: 22. x. 1983, *leg. Personnel of Tropical Marine Research Station*, Univ. of York.

Japanese specimens of *B. maxima* range in height from 12 to 38 cm, whereas the Omani specimens previously identified as *B. maxima* are 18–19 cm tall. So in terms of height, thalli of *B. maxima* are taller than the single specimen of *B. robusta*. The most obvious difference between these two species is seen in the lateral branches; in *B. maxima* they are numerous, closely set, usually only 3–6 (–7) mm in length, with a smaller diameter than the parent axis. This is also obvious in depictions of *B. maxima* in the literature (Segawa 1956; Chihara 1970, 1975). In *B. robusta*, there is very little reduction in diameter of the primary axis and the various orders of branches. Furthermore, the branches are not regularly and densely arranged, but rather they are sporadically and irregularly placed, often with long intervals between adjacent branches. The habit of *B. robusta* is thus very different from that of *B. maxima*.

In most of the laterals in *B. robusta* there is a discontinuity in the cytoplasm between the base of the lateral and the bearing axis (Fig. 7). Christensen (1994) discussed this phenomenon occurring in older branches of species of *Bryopsis* and noted that a wall can be formed across the narrowing. A wall per se was not detectable in the specimen of *B. robusta*, but there was an obvious void of cytoplasm at the constrictions.

## DISCUSSION

The genus *Bryopsis* was described by Lamouroux (1809a) and lectotypified by Egerod (1952) with *B. pennata* J. V. Lamour. Prior to the description of these two new species from the Sultanate of Oman, the genus has been regarded as comprising 47 species (see Appendix 1). A number of names in *Bryopsis* exist in the literature that are here excluded or treated as doubtful (see Appendix 2). These include names that are illegitimate, not validly published, or of "taxa inquirenda," as well as names that were transferred to other genera.

As stated earlier, Nizamuddin (1995) reported the occurrence of 16 species of *Bryopsis* for the coast of Pakistan, including four newly described species (*B. aishae*, *B. pakistanica*, *B. manorensis*, and *B. qasimensis*) and another eight species to represent first reports for Pakistan: *B. cespitosa* Kütz., *B. corticulans* (?) Setch., *B. duplex* De Not., *B. fastigiata* Kütz., *B. harveyana* J. Agardh, *B. indica* A. Gepp & E. Gepp, *B. penicillata* Suhr, and *B. pennata* J. V. Lamour. The two new species of *Bryopsis* (*B. nana* and *B. robusta*) herein described from Oman do not match up with any of the species recognized by Nizamuddin for Pakistan. In Nizamuddin's key to species, only two species are said to have radially branched thalli, *B. hypnoides* and *B. corymbosa*. For the Persian Gulf and the Gulf of Oman regions of Iran, Sohrabipour and Rabii (1999) reported three taxa of *Bryopsis*: *B. pennata* var. *secunda*, *B. pennatula* [=*B. pennata* var. *minor*], and *B. plumosa*). These taxa are also distinct from the two new species from Oman.

The dimensions of the chloroplasts have been used as a criterion in distinguishing species of *Bryopsis* (Feldmann 1937; Pignatti 1962; Medlin 1984). Drawn to the same scale with a camera-lucida, the small size of the chloroplasts of *B. nana* relative to the much larger size of those of *B. robusta* is striking (Figs. 8, 9).

The evidence supports the description of two new species of the genus *Bryopsis* from the northern Arabian Sea. Thus, seven species of the genus are now reported as occurring in Oman: *B. hypnoides*, *B. indica*, *B. maxima*, *B. nana*, *B. pennata*, *B. plumosa*, and *B. robusta*.

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# APPENDIX 1

## BRYOPSIS: ACCEPTED NAMES

**1. Bryopsis africana** Aresch., Phyc. cap., p. 5. 1851. Syntype localities: False Bay and Saldanha Bay, Cape Prov., South Africa. Icon.: Seagrief (1988, fig. 5:3); Stegenga et al. (1997a, pl. 29: 1, color pl. 32).

*Bryopsis tenuis* Levring, Acta Univ. Lund., N.F. 34(9): 13,figs. H–I; Pl. III, fig. 7. 1938. Type locality: Port Nolloth, Cape Prov., South Africa, fide Stegenga et al. (1997a), who also list *B. cespitosa* Suhr ex Kütz. (1849) as possibly an additional synonym.

**2. Bryopsis aishae** Nizam., Pakistan J. Bot. 27: 22, figs. 12a–k; 19a. 1995. Type locality: Br. Buleji, Pakistan.

**3. Bryopsis australis** Sond., Bot. Zeitung (Berlin) 3: 49. 1845. Type locality: Western Australia, probably near Fremantle, fide Womersley (1984). Icon.: Kützing (1856, pl. 81, fig. I); Hylmö (1919, figs. 31, 32); Womersley (1984, figs. 96D, E, 97B).—See Womersley and Bailey (1970), Womersley (1984), and Kraft (2000) for discussion of the relationship of this species to *B. indica*; they may be conspecific.

**4. Bryopsis cespitosa** Suhr ex Kütz., Sp. alg., p. 490. 1849. Type locality: on the shores of southern Africa. Icon.: Kützing (1856, pl. 72, fig. I). According to Stegenga et al. (1997a), this species may possibly be conspecific with *B. africana* Areschoug (1851).

**5. Bryopsis composita** C. Agardh, Spec. alg. 1: 451. 1824. Type locality: France.

*Bryopsis arbuscula* sensu Lamouroux (1809b).

**6. Bryopsis corticulans** Setch. in Collins, Holden & Setchell, Phycoth. Bor.-Amer. XIII: 626. 1899. Lectotype locality: Pacific Grove, Monterey County, California, U.S.A., fide Smith (1944). Icon.: Setchell & Gardner (1920, pl. 15, figs. 4, 5; pl. 27); Smith (1944, pl. 9, fig. 3).

*Bryopsis plumosa* f. *corticulans* (Setch.) Yendo (1917).

**7. Bryopsis corymbosa** J. Agardh, Alg. maris medit., p. 21. 1842. Type locality: Livorno, Italy. Icon.: Feldmann (1937, figs. 23:V, 28); Lee et al. (1991, figs. 2A–E; 4B).

*Bryopsis fastigiata* Kütz., Phycol. germ., p. 251. 1845. Type locality: Spalato = Split, Adriatic Sea, fide Ardissone (1886), Hamel (1931), and Funk (1955).

*Bryopsis implexa* De Not., Prosp. Fl. ligust., p. 73. 1846. Type locality: Genoa, Italy, fide Hamel (1931).

*Bryopsis pumila* Zanardini, Atti Reale Ist. Veneto Sc. 6: 245. 1847. Type locality: Venice, Italy, fide Cammerloher in Pignatti (1962).

*Bryopsis elegans* Menegh. ex Zanardini, Mem. Reale Veneto Sc. 14: 215, pl. XI-B (LXXII-B). 1868. Type locality: Adriatic Sea, fide Ardissone (1886; with "?").

*Bryopsis implexa* var. *elegans* (Menegh. ex Zanardini) Hauck (1885).

*Bryopsis alterna* Schousb. in Bornet, Mém. Soc. Sci. Nat. Cherbourg 28: 213. 1892, nomen nudum.

*Bryopsis ramosa* Schousb. in Bornet, Mém. Soc. Sci. Nat. Cherbourg 28: 213. 1892, nomen nudum, fide Nizamuddin (1995).

**8. Bryopsis cupressina** J. V. Lamour. Nouv. Bull. Sci. Soc. Philom. Paris, 1: 333. 1809. Type locality: Mediterranean coast of Africa. Icon.: Lamouroux (1809b, p. I, fig. 3a, b); Funk (1927, fig. 17d, as *B. cupressoides*). *Bryopsis balbisiana* [var.] *cupressina* (J. V. Lamour.) C. Agardh (1823).

**8a. Bryopsis cupressina** var. **cupressina**.

*Bryopsis penicillata* Suhr in Seubert, Fl. azor., p. 9, pl. 1, fig. 1. 1844. Type locality: Azores. Icon.: Kützing (1856, pl. 78, fig. II], fide Gallardo et al. (1993) and Furnari et al. (2003). *Bryopsis plumosa* (Huds.) C. Agardh f. *penicillata* (Suhr) Koster (1941).

*Bryopsis cupressoides* J. Agardh (1842), superfluous name for *B. cupressina* J. V. Lamour. (1809a).

*Bryopsis flagellata* Kütz., Tab. phycol. VI, p. 28, pl. 80, fig. II. 1856. Type locality: Venice, Italy, fide Ardissone (1886).

*Bryopsis thuyoides* Menegh., Giorn. Bot. Ital. 1(2): 252. 1845. Type locality: Spalati = Split, Croatia, Adriatic Sea, fide Ardissone (1886).

*Bryopsis sicula* Ardiss., Comment. Soc. Crittog. 1: 409. 1864. Type locality: Acireale, eastern Sicily, Italy, fide Ardissone (1886).

*Bryopsis pseudoplumosa* Ardiss., Comment. Soc. Crittog. 1: 409. 1864. Syntype localities: Catania and Messina, Sicily, Italy, fide Ardissone (1886).

*Bryopsis pinastroides* Schousb. in Bornet, Mém. Soc. Sci. Nat. Cherbourg 28: 214. 1892, nomen nudum.

**8b. Bryopsis cupressina** var. **adriatica** (J. Agardh) M. J. Wynne, **comb. nov.** Basionym: *Bryopsis cupressoides* var. ? *adriatica* J. Agardh, Algae maris medit., p. 20. 1842. Syntype localities: Island of Lido, near Venice, Adriatic Sea; and "ad Galloprovinciae littus" = shore of the French province. *Bryopsis hypnoides* f. *adriatica* (J. Agardh) J. Agardh (1887). *Bryopsis plumosa* var. *adriatica* (J. Agardh) Hauck (1885). *Bryopsis adriatica* (J. Agardh) Kütz. (1845).—According to Furnari et al. (1999), Frauenfeld (1854) should be credited with first proposing the combination *Bryopsis adriatica* rather than Menegh. ex Kütz. (1856), which is the authorship usually cited. Yet, Kützing (1845, p. 252) published this combination still earlier. *Bryopsis plumosa* var. *adriatica* (J. Agardh) Hauck (1885); *Bryopsis hypnoides* var. *adriatica* (J. Agardh) J. Agardh (1887). Ardissone (1886) treated *B. adriatica* as conspecific with *B. cupressina* ["*B. cupressoides*"], but other authors (e. g., Furnari et al., 2003) recognized it as distinct. Pignatti (1962) and Coppejans (1983) recognized *B. cupressoides* var. *adriatica* J. Agardh, but *B. cupressoides* J. Agardh is an illegitimate name.

**9. Bryopsis densa** Pilg., Bot. Jahrb. Syst. 57: 1. 1920. Type locality: Annobon Island, Spanish Guinea, Gulf of Guinea, West Africa.

**10. Bryopsis derbesioides** V. J. Chapm., J. Linn. Soc. Bot. 55: 481, fig. 143, pl. 45. 1956. Type locality: Motuarohia Bay, Bay of Islands, North Island, New Zealand.

*Bryopsis fusca* V. J. Chapm., J. Linn. Soc. Bot. 55: 486, fig. 149, II; pl. 46. 1956. Type locality: Matauri Bay, Nelson, New Zealand, fide Adams (1994).

*Bryopsis corticulans* Setch. var. *novaezelandiae* V. J. Chapm., J. Linn. Soc. Bot. 55: 486. 1956. Type locality: Takapuna, Auckland district, New Zealand, fide Adams (1994).

**11. Bryopsis dichotoma** De Not., Giorn. Bot. Ital. 1(1): 321. 1844. Type locality: Genoa, Ligurian Sea, northwestern Italy.

*Bryopsis comoides* De Not., Giorn. Bot. Ital. 1(1): 320. 1844. Type locality: Genoa, Ligurian Sea, northwestern Italy, fide Ardissone (1886).

**12. Bryopsis duplex** De Not., Giorn. Bot. Ital. 1(1): 320. 1844. Type locality: Genoa, Ligurian Sea, northwestern Italy.

*Bryopsis balbisiana* var. *disticha* J. Agardh, Alg. mar. med., p. 18. 1842. Syntype localities: Livorno and Genoa, Italy; Marseilles, France; and Adriatic Sea, fide Ardissone (1886) and Furnari et al. (2003). *Bryopsis disticha* (J. Agardh) Kütz. (1856). *Bryopsis balbisiana* [var. *disticha*] f. *nuda* J. Agardh, Alg. mar. med., p. 19. 1842; *Bryopsis balbisiana* var. *simpliuscula* (J. Agardh) Zanardini (1847); basionym: *Bryopsis balbisiana* [var. *disticha*] f. *simpliuscula* J. Agardh, Alg. mar. med., p. 19. 1842; *Bryopsis balbisiana* var. *prolifera* (J. Agardh) Zanardini (1847); basionym: *Bryopsis balbisiana* [var. *disticha*] f. *prolifera* J. Agardh, Alg. mar. med., p. 19. 1842.

*Bryopsis intricata* Menegh., Giorn. Bot. Ital. 1(2): 247. 1845a. Syntype localities: Capocesto (Croatia) and Spalati = Split, Adriatic Sea, fide Ardissone (1886) and DeToni (1889).

*Bryopsis caudata* Kütz., Tab. phycol. VI: 27, pl. 77, fig. II. 1856. Type locality: Lessina Island, Adriatic Sea. *Bryopsis duplex* var. *caudata* (Kütz.) Ardiss. (1886).

*Bryopsis duplex* var. *derbesioides* Schiffn., Oesterr. Bot. Z. 84: 113. 1935. Type locality: Venice, Italy, Schiffner and Vatova (1938), fide Furnari et al. (1999).

**13. Bryopsis eckloniae** Stegenga, Bolton & R. J. Anderson, Contr. Bolus Herb. 18: 128, pl. 29: 2. 1997. Type locality: Muizenberg, Cape Prov., South Africa.

**14. Bryopsis feldmannii** Gallardo & G. Furnari in Gallardo et al., Bot. Mar. 36: 409. 1993, nomen novum for *Bryopsis cupressoides* Feldmann, Rev. Algol. 9: 224, figs. 23: II, 25A, 26A. 1937, non *Bryopsis cupressoides* J. Agardh (1842), nomen superfluum. Type locality: Banyuls sur Mer, Pyrénées Orientales, France. Icon.: Kützing (1856, pl. 79, fig. I).

**15. Bryopsis foliosa** Sond., Bot. Zeit. (Berlin) 3: 49. 1845. Type locality: western Australia, probably near Fremantle, fide Womersley (1984). Icon.: Womersley (1984, figs. 94E, 95A, B).

*Bryopsis gracilis* Sond., Bot. Zeit. 3: 49. 1845, fide Womersley (1956). Type locality: western Australia.

**16. Bryopsis gemellipara** J. Agardh, Acta Univ. Lund. 23(2): 25. 1887. Type locality: Queenscliff, Victoria, Australia. Icon.: Womersley (1984, figs. 97C, 98A,B).

*Bryopsis tetrasticha* V. J. Chapm., J. Linn. Soc. Bot. 55: 483, fig. 145, pl. 45. 1956. Type locality: Akaroa, Banks Peninsula, New Zealand, fide Adams (1994).

*Bryopsis moorei* V. J. Chapm., J. Linn. Soc. Bot. 55: 480, fig. 140, pl. 43. 1956. Type locality: Ocean Beach, Cape Kidnappers, New Zealand, fide Adams (1994).

**17. Bryopsis halliae** W. R. Taylor, Phycologia 2: 26, fig. 1. 1962. Type locality: Key West, Florida, U.S.A.

**17ba. Bryopsis halliae** var. **halliae.**

**17b. Bryopsis halliae** var. **filicina** (Collins & Herv.) W. R. Taylor Phycologia 2: 27. 1962. *Bryopsis duchassaingii* var. *filicina* Collins & Herv., Alg. Bermuda, p. 61. 1917. Type locality: near Flatts Bridge, Bermuda.

**18. Bryopsis hypnoides** J. V. Lamour., Nouv. Bull. Sci. Soc. Philom. Paris, 1: 333. 1809. Type locality: Mediterranean coast of France. Fide Lamouroux (1809b): "prope *Cette*": Séte, dept. Hérault, France. Icon.: Lamouroux (1809b, pl. I, fig. 2a, b); Harvey 1846–1851, pl. 119); Kützing (1856, pl. 73, fig. I, as "*Bryopsis secunda*," fide Pignatti, 1962); Feldmann (1937, figs. 23: IV, 27C; Burr & West 1970, figs. 1–43); Burrows (1991, fig. 57B). *Bryopsis plumosa* var. *hypnoides* (J. V. Lamour.) Kütz. (1849). *Bryopsis plumosa* var. *arbuscula* (C. Agardh) J. Agardh (1842); basionym: *Bryopsis arbuscula* C. Agardh (1823), non *Bryopsis arbuscula* (DC.) J. V. Lamour. (1809).—Rull Lluch (2002) summarized the debate on whether *B. hypnoides* and *B. plumosa* are conspecific, but he pointed out that most recent workers continue to recognize this pair of species as distinct.

*Bryopsis monoica* Berthold ex Funk, Pubbl. Staz. Zool. Napoli 7 (Suppl.): 332. 1927. Type locality: Capo Posillipo, near Naples, Italy, fide Gallardo et al. (1993). Icon.: Feldmann (1937, figs. 23: VI, 29, 30).

*Bryopsis hypnoides* f. *atlantica* J. Agardh, Acta Univ. Lund. 23(2): 28. 1887. Type locality: not stated.

*Bryopsis hypnoides* f. *prolongata* J. Agardh, Acta Univ. Lund. 23(2): 28. 1887 [based on Harvey (1846–1851), pl. 119, *B. hypnoides*]. Syntype localities: England and Ireland.

**19. Bryopsis indica** A. Gepp & E. Gepp, Trans. Linn. Soc. London, Bot. 7: 169, pl. 22, figs. 10, 11. 1908,Syntype localities: Chagos Archipelago; Coetivy Reef; Mauritius; Sri Lanka.

**19a. Bryopsis indica** var. var. **indica.**

**19b. Bryopsis indica** var. **triseriata** E. Y. Dawson, Pacific Naturalist 4: 4, pl. 1, fig. 1, pl. 3, fig. 5. 1963. Type locality: Punta Suárez, Hood Island, Galapagos Archipelago, Ecuador.

**19c. Bryopsis indica** forma **unilateralis** Cribb, Univ. Queensland Pap. Dept. Bot. 3(3): 18, pl. 1, fig. 3. 1954. Type locality, Miami, southeast Queensland, Australia.

**20. Bryopsis lindaueri** V. J. Chapm., J. Linn. Soc. Bot. 55: 480, fig. 141, pl. 43. 1956. Type locality: Reef Point, North Auckland, North Island, New Zealand.—This species was not included in Adams's (1994) marine algal flora of New Zealand.

**21. Bryopsis lyngbyei** Hornem., Fl. dan., vol. 9, fasc. 27, pl. 1603. 1818. Type locality: Faeroes, North Atlantic. Icon.: Lyngbye (1819, pl. 19B). *Bryopsis plumosa* f. *lyngbyei* (Hornem.) J. Agardh (1887).—Although this taxon had earlier been treated [e.g., by Agardh (1823), Areschoug (1850), and Ardissone (1886)] as

conspecific with *B. plumosa*, Kornmann and Sahling (1976) presented evidence that it is distinct from *B. plumosa*. Subsequent authors (Åsen 1980; Stegenga et al. 1997b; Bartsch & Kuhlenkamp 2000) have accepted it as *B. lyngbyei*.

**22. Bryopsis macraildii** Womersley, Mar. benthic fl. S. Aust., Pt. 1: 276, figs. 93C–E, 94C, D. 1984. Type locality: King Head, Rottnest Island, Western Australia.

**23. Bryopsis magellanica** Hylmö, Wiss. Ergeb. Schwed. Südpolar-Exped. 1901–1903, 4(6): 16, fig. 33. 1919. Type locality: Fuegia, South America.

**24. Bryopsis manorensis** Nizam., Pakistan J. Bot. 27: 24, figs. 13a–f, 21c. 1995. Type locality: Manora, Pakistan.

**25. Bryopsis maxima** Okamura ex Segawa, Genshoku Nihon Kaiso Zukan, p. 14, pl. 7, fig. 63. 1956. Type locality: Japan.—In the protologue Okamura (1936) referred to his novelty as "sp. nov. prov." and thus the name was not validly published (Article 34; Greuter et al. 2000). Segawa (1956) validated the name with a brief description (in Japanese) and a figure.

**26. Bryopsis minor** Womersley, Pacific Sci. 9: 387, fig. 1. 1955. Type locality: American River Inlet, Kangaroo I., S. Australia. Icon.: Womersley (1984, figs. 93A, B, 94A, B).

**27. Bryopsis muscosa** J. V. Lamour., Nouv. Bull. Sci. Soc. Philom. Paris, 1: 333. 1809. Type locality: French Mediterranean coast. Icon.: Lamouroux (1809b, pl. 1, fig. 4a, b); Kützing (1856, pl. 82, fig. I); Funk (1927, fig. 17b); Hamel (1931,fig. 21: A).

*Bryopsis pinastroides* Schousb. in Bornet, Mém. Soc. Sci. Nat. Cherbourg 28: 214. 1892, nomen nudum.

**28. Bryopsis myosuroides** Kütz., Tab. phycol. VI: 27, pl. 77, fig. I. 1856. Type locality: Port Natal = Durban, Natal Prov., South Africa.

*Bryopsis setacea* Hering, Ann. Mag. Nat. Hist. 8: 91. 1841, non *Bryopsis setacea* J. V. Lamour. (1822). Type locality: Port Natal = Durban, Natal Prov., South Africa, fide Barton (1893).

*Bryopsis flanaganii* Barton, J. Bot. 33: 162, pl. 349, 'flanagani'. 1895. Type locality "British Kaffraria" [between Great Kei and Great Fish rivers, Cape Prov.], South Africa, fide Silva et al. (1996).

**29. Bryopsis nana** M. J. Wynne, Contr. Univ. Michigan Herb. 24: 230. 2005. Type locality: Western side of Wadi Zeid (=Hoon's Bay) (16.94497°N, 54.80402°E), east of Mirbat, Dhofar, Sultanate of Oman.

**30. Bryopsis pakistanica** Nizam., Pakistan J. Bot. 27: 17, figs. 9a–f, 21b. 1995. Type locality: Buleji, Pakistan.

**31. Bryopsis palliolatis** Kraft & A. Millar in Kraft, Austral. Syst. Bot. 13: 625, fig. 40, 2000. Type locality: Old Gulch, north end of Lord Howe Island, Australia.

**32. Bryopsis penicillum** Menegh., Giorn. Bot. Ital. 1(2): 387. 1845. Type locality: Dalmatia, Adriatic Sea. Icon.: Zanardini (1866, pl. 48, B); Funk (1927, fig. 17g).

**33. Bryopsis pennata** J. V. Lamour., Nouv. Bull. Sci. Soc. Philom. Paris, 1: 333. 1809. Type locality: Antilles, Caribbean Sea. Icon.: Lamouroux (1809b, pl. 3, fig. 1a, b); Egerod (1952, fig. 7).—Ballesteros (1990) treated *B. pennata* as conspecific with *B. plumosa*, but he treated *B. secunda* [=*B. pennata* var. *secunda*] as a distinct species.

**33a. Bryopsis pennata** var. **pennata**. *Bryopsis pennata* var. *major* J. Agardh (1887); *Bryopsis plumosa* var. *pennata* (J. V. Lamour.) Børgesen (1911).

*Bryopsis galapagensis* W. R. Taylor, Allan Hancock Pacific Exped. 12: 60, fig. 1; pl. 6, fig. 1. 1945. Type locality: Isla Wenman, Galapagos Islands, Ecuador, fide Bula-Meyer (1995).

**33b. Bryopsis pennata** var. **leprieurii** (Kütz.) Collins & Herv., Proc. Amer. Acad. Arts 53: 62. 1917. *Bryopsis leprieurii* Kütz., Sp. alg., p. 490. 1849. Type locality: Cayenne, French Guiana. *Bryopsis plumosa* var. *leprieurii* (Kütz.) Børgesen (1911).

**33c. Bryopsis pennata** var. **minor** J. Agardh, Acta Univ. Lund. 23(2): 23. 1887.

*Bryopsis pennatula* J. Agardh, Öfvers. Förh. K. Sv. Vet.-Akad. 4: 6. 1847, homotypic synonym (see Silva et al. 1996). Type locality: San Agustín, Oaxaca, Mexico.—*Bryopsis pennulata* in Kützing (1849) is an orthographic variant of *Bryopsis pennatula*.

**33d. Bryopsis pennata** var. **secunda** (Harv.) Collins & Herv., Proc. Amer. Acad. Arts 53: 62. 1917. *Bryopsis plumosa* var. *secunda* Harv., Smithsonian Contr. Knowl. 10(2): 31, pl. XLV-A, figs. 1–3. 1858. Syntype localities: Key West and Sand Key, Florida, U.S.A. Icon.: Taylor (1928, pl. 11, figs. 11, 12).

*Bryopsis harveyana* J. Agardh, Acta Univ. Lund. 23(2): 22. 1887. Syntype localities: Florida, U.S.A.; Tonga, South Pacific. Cf. Silva et al. (1996).

**34. Bryopsis plumosa** (Huds.) C. Agardh, Spec. alg. 1: 448. 1823. *Ulva plumosa* Huds., Fl. angl., p. 571, 1778. Type locality: Exmouth, Devon, England. Icon.: Smith & Sowerby (1812, pl. 2375); Harvey (1846–1851, pl. III); Womersley (1984, figs. 96C, 97A); Burrows (1991, fig. 57A; pl. 8); Lee et al. (1991, figs. 1A–E; 4A).

**34a. Bryopsis plumosa** var. **plumosa.**

*Bryopsis arbuscula* (DC.) J. V. Lamour., Nouv. Bull. Sci. Soc. Philom. Paris, 1: 333. 1809, nomen superfluum. Lamouroux based the combination on *Fucus arbuscula* DC. in Lamarck & de Candolle, Fl. franç. ed. 3, vol. 1: 35. 1805, but also cited in synonymy the earlier name *Ulva plumosa* Huds. (1778). Icon.: Lamouroux (1809b, pl. 1, fig. 1). *Bryopsis plumosa* f. *arbuscula* (DC.) J. Agardh (1887). *Bryopsis hypnoides* var. *arbuscula* (DC.) Schiffner (1935).

*Conferva tenax* Roth, Cat. Bot. 3: 182. 1806, nomen superfluum, non *Conferva plumosa* J. Ellis (1768); Roth should have based the combination on *Fucus arbuscula* DC. in Lamouroux & A. P. de Candolle, 1805, the next available basionym.

*Bryopsis abietina* Kütz., Phycol. germ., p. 252. 1845. Type locality: Spalato = Split, Adriatic Sea, fide Ardissone (1886) and Pignatti (1962). Icon.: Kützing (1856, pl. 80, fig. I).

*Bryopsis plumosa* subsp. *condensata* Kjellm., Bih. Kongl. Svenska Vetensk.-Akad. Handl. 23: 32. 1897. Type locality: Yenoshima, Japan, fide Yoshida et al. (1990).

*Bryopsis pinastroides* var. *arborescens* Schousb. in Bornet, Mém. Soc. Sci. Nat. Cherbourg 28: 213. 1892, nomen nudum.

*Bryopsis plumosa* var. *prolifera* Schiffner, Oesterr. Bot. Z. 84: 116. 1938, fide Furnari et al. (1999).

*Bryopsis plumosa* var. *ramellosa* Schiffner, Oesterr. Bot. Z. 84: 116. 1938, fide Furnari et al. (1999).

*Bryopsis plumosa* var. *robusta* Schiffner, Oesterr. Bot. Z. 84: 114. 1938. Type locality: Venice, Italy, fide Furnari et al. (1999).—Schiffner's *B. plumosa* var. *robusta* includes old reports of "*Bryopsis rosae*" from the Mediterranean.

*Bryopsis canterburyensis* V. J. Chapm., J. Linn. Soc. Bot. 55: 481, fig. 142; pl. 44. 1956. Type locality: Lyttleton, eastern South Island, New Zealand, fide Adams (1994).

*Bryopsis olivacea* V. J. Chapm., J. Linn. Soc. Bot. 55: 482, fig. 144; pl. 45. 1956. Type locality: Akaroa, eastern South Island, New Zealand, fide Adams (1994).

*Bryopsis pseudopennata* V. J. Chapm., J. Linn. Soc. Bot. 55: 485, fig. 148, I; pl. 46. 1956. Type locality: Worser Bay, Wellington, North Island, New Zealand, fide Adams (1994).

*Bryopsis pseudoplumosa* V. J. Chapm., J. Linn. Soc. Bot. 55: 484, fig. 148, II; pl. 45. 1956, non *Bryopsis pseudoplumosa* Ardissone (1864). Type locality: Taylor's Mistake, Banks Peninsula, South Island, New Zealand, fide Adams (1994).

**Bryopsis plumosa** [var. *plumosa*] f. **elongata** Koster, Blumea 4: 234, fig. 2: 16. 1941. Type locality: Naples, Italy.—This forma was not listed by Gallardo et al. (1993) in their check-list of Mediterranean Chlorophyceae.

**Bryopsis plumosa** [var. *plumosa*] f. **gracilis** Koster, Blumea 4: 244, fig. 2: 13–15. 1941. Type locality: Naples, Italy.—This forma was not listed by Gallardo et al. (1993) in their check-list of Mediterranean Chlorophyceae.

**34b. Bryopsis plumosa** var. **densa** Harv., Smithsonian Contr. Knowl. 10(2): 31. 1858. Syntype localities: Key West and Sand Key, Florida, USA.

**35. Bryopsis pottsii** Setch., Publ. Carnegie Inst. Wash. 341: 175, pl. 20, fig. A. 1924. Type locality: Pago Pago harbor, Tutuila Island, Samoa, South Pacific.

**36. Bryopsis qasimensis** Nizam., Pakistan J. Bot. 27: 29, figs. 17a, b, 22. 1995. Type locality: Qasim, Pakistan.

**37. Bryopsis ramulosa** Mont., Hist. fis. Cuba, Bot. (R. de la Sagra) 8: 16, pl. III, fig. 2. 1842. Type locality: In portu Havanensi Insulae Cubae = Havana, Cuba. Kützing (1856, pl. 72, fig. II). *Bryopsis plumosa* var. *ramulosa* (Mont.) Harv. (1858). Icon.: Harvey (1858, pl. 45 A, figs. 4–6).

**38. Bryopsis rhizoidea** V. J. Chapm., J. Linn. Soc. Bot. 55: 477, fig. 137; pl. 41. 1956. Type locality: Scott's Point, 90 Mile Beach, New Zealand.—This species was not included in Adams's (1994) marine algal flora of New Zealand.

**39. Bryopsis rhizophora** M. Howe, Mem. Torrey Bot. Club 15: 38, pl. 6, fig. a; pl. 7. 1914. Type locality: Pescadores Islands, region of Ancón, Peru. Icon.: Icon.: Borasco de Zaixso (2000, fig. 1-22); Wysor (2004, figs. 8–10).

*Bryopsis peruviana* W. R. Taylor, Pap. Michigan Acad. Sci. 31: 63, pl. II, fig. 1. 1947. Type locality: Paita, Peru, fide Dawson et al. (1964).

**40. Bryopsis robusta** M. J. Wynne, Contr. Univ. Michigan Herb. 24: 233. 2005. Type locality: Raaha (=Alto) Bay (16.95116°N, 54. 81650°E), E of Mirbat, Dhofar, Sultanate of Oman.

**41. Bryopsis rosae** ['*rosa*'] C. Agardh, Spec. alg. p. 450. 1823. Type locality: Falkland Islands. Icon.: Bory (1826, pl. 24, fig. 1); Kützing (1856, pl. 84, fig. II); Ducker (1979, fig. 11).—Although Nizamuddin (1995) treated *B. rosae* as conspecific with *B. plumosa*, Ramírez and Santelices (1991) recognized this species as distinct.

**42. Bryopsis ryukyuensis** Yamada, J. Fac. Sci. Hokkaido Imp. Univ., Ser. 5, Bot., 3: 59, figs. 27–29. 1934. Type locality: Itoman, Ryukyus, Japan.

**43. Bryopsis salvadoreana** E. Y. Dawson, Pacific Naturalist 2: 405, pl. 5, fig. 2; pl. 6. 1961. Type locality: Secate reef, off Punta Chiriquín, Golfo de Fonseca, El Salvador, Central America. Icon.: Wysor (2004, figs. 11–12).

**44. Bryopsis secunda** J. Agardh, Linnaea 15: 454. 1841. Type locality: "In mari mediterraneo ad Massiliam" = Marseilles, France. This is heterotypic with *Bryopsis pennata* J. V. Lamour. var. *secunda* (Harv.) Collins & Herv. (1917). Cf. Silva et al. (1996).—Kützing's (1856) pl. 73, fig. I "*Bryopsis secunda*" is *B. hypnoides*, fide Pignatti (1962).

**45. Bryopsis spinescens** Zeller, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1875, ser. 3, 7: 429. 1876. Type locality: vicinity of Rio de Janeiro, Brazil.

**46. Bryopsis stenoptera** Pilg., Bot. Jahrb. Syst. 46: 295, figs. 1, 2. 1912. Type locality: Elabi, Cameroun, West Africa. Icon.: Lawson & John (1982, pl. 8, figs. 6, 7).

**47. Bryopsis stolonifera** W. J. Lee, S. M. Boo & I. K. Lee, Korean J. Phyc. 6: 26, figs. 3A–F, 4C–E. 1991. Type locality: Summok, Ullungdo Island, Korea.

**48. Bryopsis triploramosa** Kobara & Chihara, J. Jap. Bot. 70: 182, figs. 1–21. 1995. Type locality: Kyan, Itoman-shi, Okinawa Pref., Okinawa Island, southern Japan.

**49. Bryopsis vestita** J. Agardh, Acta Univ. Lund. 14(4): 3. 1877. Syntype localities: New Zealand and Chatham Islands. Lectotype locality: Warrington, Otago, New Zealand, fide Womersley (1984). Icon.: Womersley (1984, figs. 95C, 96A, B); Adams (1994, pl. 9).—Adams (1994) stated that Chapman's (1956) *B. otagensis*, *B. scarfei*, and *B. pseudocorymbosa* "may be atypical *B. vestita* from turbid pools or muddy shallows," and she thus did not recognize them as separate species. Chapman's (1956) *Bryopsis vestita* f. *chathamensis* was not recognized as distinct from the nominate forma by Nelson et al. (1991).

**Bryopsis vestita** f. **brevis** V. J. Chapm., J. Linn. Soc. Bot. 55: 476. 1956. Type locality: New Plymouth, Greymouth, Auckland Islands.

**Bryopsis vestita** f. **densa** V. J. Chapm., J. Linn. Soc. Bot. 55: 476, fig. 134. 1956. Type locality: Lyttelton, Canterbury, South Island, New Zealand.

**Bryopsis vestita** f. **laxa** V. J. Chapm., J. Linn. Soc. Bot. 55: 476, pl. 39. 1956. Type locality: not stated.

**Bryopsis vestita** f. **virgata** V. J. Chapm., J. Linn. Soc. Bot. 55: 476. 1956. Type locality: Lyttelton, Canterbury, South Island, New Zealand.

## APPENDIX 2
### BRYOPSIS: DOUBTFUL AND EXCLUDED NAMES

*Bryopsis alterna* Schousb. in Bornet, Mém. Soc. Sci. Nat. Cherbourg 28: 213. 1892, nomen nudum.

*Bryopsis ambigua* (Okamura) Okamura (1902) = *Caulerpella ambigua* (Okamura) Prud'homme & Lokhorst (1992).

*Bryopsis apiocarpa* Menegh., Giorn. Bot. Ital. 1(2): 385. 1845. Type locality: Dalmatia, coast of Adriatic Sea.—According to Pignatti (1962) the name applies to a species of *Derbesia*.

*Bryopsis arbuscula* C. Agardh, Spec. alg. 1: 451. 1823, non *Bryopsis arbuscula* (DC.) Lamouroux (1809); Agardh excluded the type of *Fucus arbuscula* DC. (and thus also the type of *Ulva plumosa*) (Art. 48. 1). *Bryopsis plumosa* var. *arbuscula* (C. Agardh) J. Agardh (1842).

*Bryopsis arbuscula* (DC.) J. V. Lamour., Nouv. Bull. Sci. Soc. Philom. Paris, 1: 333. 1809, nomen superfluum. Lamouroux based the combination on *Fucus arbuscula* DC. in Lamarck & de Candolle, Fl. franç. ed. 3, vol. 1: 35. 1805, but also cited the earlier name *Ulva plumosa* Huds. (1778). Icon.: Lamouroux (1809b, pl. 1, fig. 1).

*Bryopsis baculifera* J. Agardh, Acta Univ. Lund. 23(2): 21. 1887. Type locality: Port Phillip, Victoria, Australia. = *Chlorodesmis baculifera* (J. Agardh) Ducker (1966).

*Bryopsis balbisiana* J. V. Lamour. ex C. Agardh, Spec. alg. 1: 449. 1823. Type locality: French Mediterranean. Icon.: Lamouroux (1813, pl. 13, fig. 2).—The application of this name is in doubt. Upon examining Lamouroux's original material in PC, Hamel (1931) considered it to belong to *Derbesia* and proposed *D. balbisiana* (J. V. Lamour.) Hamel. Feldmann (1937), however, came up with a different conclusion after he examined original specimens deposited in Caen. Feldmann found two different genera in the envelope. The material was in part *Derbesia*, and in part identifiable as *Bryopsis duplex*, the latter bearing the name "*Bryopsis balbisiensis*" in Lamouroux's handwriting. Feldmann attributed the latter specimen to *Bryopsis*; however, this specimen differs from Lamouroux's illustration. Feldmann's concept has been attributed to *Bryopsis duplex*. No authentic specimens of *Bryopsis balbisiana* now exist, and so Lamouroux's illustration (1813, pl. 13, fig. 2) must be regarded as the type (iconotype). It cannot be resolved whether the drawing represents a species of *Bryopsis* or of *Derbesia*.

*Bryopsis balbisiana* var. *divaricata* Zanardini (1847), nomen nudum.

*Bryopsis balbisiana* var. *interrupta* Kütz., Phycol. germ., p. 251. 1845. Type locality: Adriatic Sea. = *Pedobesia simplex* (Kütz.) M. J. Wynne & Leliaert (2001).

*Bryopsis balbisiana* var. *lamourouxii* J. Agardh, Alg. mar. medit., p. 18. 1842. Syntype localities: Livorno, Italy, and Villefranche, France. = *Pedobesia simplex* (Kütz.) M. J. Wynne & Leliaert (2001).

*Bryopsis clavaeformis* J. Agardh, Acta Univ. Lund. 23(2): 20. 1887. Type locality: Western Port, Victoria, Australia. = *Pedobesia clavaeformis* (J. Agardh) MacRaild & Womersley (1974).

*Bryopsis confervoides* Decne., Arch. Mus. Hist. Nat. Paris 2: 126. 1841, nomen superfluum; based on *Conferva prolifera* Roth (1797).

*Bryopsis confervoides* Zanardini, Sagg. classif. Ficee, p. 60. 1843, non *Bryopsis confervoides* Decne. (1841).

*Bryopsis constricta* Zanardini, Mem. Reale Ist. Veneto Sc. 14: 213, pl. 72A. 1868. Type locality: Dalmatia coast, Adriatic Sea. Icon.: Zanardini (1868, pl. 72A). Zanardini cited the name in his publication of 1843 as a nomen nudum.—This name was regarded by De Toni (1889) to apply either to *Derbesia lamourouxii* (J. Agardh) Solier [=*Pedobesia simplex* (Kütz.) M. J. Wynne & Leliaert] or *Espera mediterranea* [=*Penicillus capitatus* f. *mediterraneus* (Decane.) P. Huvé & H. Huvé (1963)]. Ardissone (1886) included the name with a question mark in his synonymy of *Derbesia lamorouxii*.

*Bryopsis cupressoides* J. Agardh, Alg. mar. medit., p. 20. 1842, a superfluous name for *Bryopsis cupressina* J. V. Lamour. (1809).

*Bryopsis cupressoides* Feldmann, Rev. algol. 9: 224. 1937, non *Bryopsis cupressoides* J. Agardh (1842).

*Bryopsis dalmatica* Kütz., Tab. Phycol. VI: 26, pls. 74, fig. I, as "*Bryopsis adriatica*," 1856. Type locality: Adriatic Sea. *Bryopsis duplex* var. *dalmatica* (Kütz.) Schiffner (1935) = *Pedobesia simplex* (Kütz.) M. J. Wynne & Leliaert (2001).

*Bryopsis dasyphylla* Zanardini, Atti Ist. Veneto Sci., Lett. Arti 6: 244. 1847. Type locality: Gulf of Venice, Adriatic Sea. "Taxon inquirendum," fide Gallado et al. (1993) and Furnari et al. (1999).

*Bryopsis duchassaingii* J. Agardh, Öfvers. Förh. K. Sv. Vet.-Akad. 11: 107. 1854. = *Trichosolen duchassaingii* (J. Agardh) W. R. Taylor (1962b).

*Bryopsis duplex* f. *luxurians* Schiffner & Vatova (1938), nomen nudum.

*Bryopsis duplex* var. *pseudo-derbesia* Schiffner, Oesterr. Bot. Z. 84: 113. 1935. Type locality: Venice, Italy; listed as *Bryopsis duplex* var. *pseudoderbesia* Schiffner in Schiffner and Vatova (1938). "Taxon inquirendum," fide Furnari et al. (1999).

*Bryopsis flagellata* Kütz., Tab. Phycol. VI: 28, pl. 80, fig. II. 1856. Type locality: Venice, Italy. *Bryopsis hypnoides* var. *flagellata* (Kütz.) Schiffner in Schiffner & Vatova (1938). "Taxon inquirendum," fide Furnari et al. (1999).

*Bryopsis furcellata* Zanardini, Sagg. classif. Ficee, p. 60. 1843. Type locality: Adriatic Sea. Icon.: Kützing (1856, pl. 71, fig. II); Zanardini (1863, pl. XVIII-A). = *Pseudochlorodesmis furcellata* (Zanardini) Børgesen (1925).

*Bryopsis gasparrinii* Menegh., Giorn. Bot. Ital. 1(1): 303. 1844. Type locality: Palermo, Sicily, Italy. = *Bryopsis myura*, fide Ardissone (1886) = *Pseudobryopsis myura* (J. Agardh) Berthold. —Pignatti (1962) treated *B. gasparrinii* as conspecific with *B. muscosa*.

*Bryopsis halymeniae* Berthold ex Funk, Pubbl. Staz. Zool. Napoli 7 (Suppl.): 330, fig. 17f. 1927. Syntype localities: 7–12 m, depth at Sa. Lucia and Secca di San Giovanni, near Naples, Italy. Icon.: Funk (1955, Pl. II, 1–3). = *Bryopsidella neglecta* (Berthold) Rietema (1970).—Berthold (1882) listed "*Bryopsis halymeniae*" as a nomen nudum (De Toni 1889), as did Oltmanns (1904).

*Bryopsis hypnoides* var. *lagunarum* Schiffner in Schiffner & Vatova, La Laguna di Venezia. Monografia 3: 189. 1938. Type locality: Venice, Italy. "Taxon inquirendum," fide Furnari et al. (1999).

*Bryopsis hypnoides* [var. *lagunarum*] f. *subnuda* Schiffner in Schiffner & Vatova, La Laguna di Venezia. Monografia 3: 190. 1938. Type locality: Adriatic shore of Italy. "Taxon inquirendum," fide Furnari et al. (1999).

*Bryopsis implexa* De Not., Prosp. Fl. ligust., p. 73. 1846. Type locality: Genoa, Ligurian Sea, Italy. "Taxon inquirendum," fide Pignatti (1962), Gallardo et al. (1993), and Furnari et al. (2003).

*Bryopsis incompta* Menegh. ex Zanardini, Mem. Reale Ist. Veneto Sc. 12: 407, pl. XXI-A (XLVIII-A). 1865. Syntype localities: Zara = Zadar; Sebenico = Sibenik; Lesina = Hvaris, all in the Adriatic Sea. = *Pedobesia simplex* (Kütz.) M. J. Wynne & Leliaert, fide Wynne and Leliaert (2001)

*Bryopsis incurva* Menegh. ex Frauenfeld, Alg. dalmat. Küste, p. 22. 1855. Type locality: Capocesto (Croatia).—This name first appeared in Frauenfeld (1854) as a nomen nudum. "Taxon inquirendum."

*Bryopsis intricata* Derbès & Solier, Compt. Rend. Hebd. Séances Acad. Sci. 1 (Suppl.): 41, pl. XI, figs. 6–9. 1856, non *Bryopsis intricata* Menegh. (1845) [=*B. duplex* De Not.]. Type locality: not stated. *Bryopsis duplex* var. *intricata* Ardiss. (1886).

*Bryopsis ligustica* Ardiss., Comment. Soc. Crittog. 1: 407. 1864. Type locality: Portofino, Italy. = *Pedobesia simplex,* fide DeToni (1889).

*Bryopsis lubrica* Cribb; cited in Algae-base (Guiry & Nic Dhinncha 2003) with a reference to Phillips (1997), nomen nudum.

*Bryopsis myura* J. Agardh, Alg. mar. medit., p. 20. 1842. Syntype localities: Amalfi, Italy; Livorno, Italy; Nice, France. Icon.: Kützing (1856, pl. 82, fig. II); Zanardini (1863, pl. XVIII-B). = *Pseudobryopsis myura* (J. Agardh) Berthold in Oltmanns (1904).—Henne and Schnetter (1999) disagreed with Taylor's (1962b) earlier merger of *Pseudobryopsis* and *Trichosolen*, which placed *Bryopsis myura* in *Trichosolen*, as *T. myura* (J. Agardh) W. R. Taylor. Henne and Schnetter (1999) offered evidence to maintain two separate genera.

*Bryopsis pachynema* G. Martens, Preuss. Exped. Ost.-As., Tange, p. 24, pl. IV, fig. 2. 1868. = *Valoniopsis pachynema* (G. Martens) Børgesen (1934).

*Bryopsis panizzei* De Not., Prosp. Fl. ligust., p. 73. 1846. Type locality: San Remo, Italy. = *Bryopsis myura* J. Agardh, fide Ardissone (1886) and DeToni (1889). = *Pseudobryopsis myura* (J. Agardh) Berthold in Oltmanns (1904).

*Bryopsis petteri* Menegh., Giorn. Bot. Ital. 1(2): 246. 1845. Type locality: "ad rupes profunde submerses. Spalati" = Split, Croatia, Adriatic Sea. = *Bryopsis myura*, fide Zanardini (1863) and Ardissone (1886) = *Pseudobryopsis myura* (J. Agardh) Berthold.

*Bryopsis pinastroides* Schousb. in Bornet, Mém. Soc. Sci. Nat. Cherbourg 28: 214. 1892, nomen nudum.

*Bryopsis pinastroides* var. *arborescens* Schousb. in Bornet, Mém. Soc. Sci. Nat. Cherbourg 28: 213. 1892, nomen nudum.

*Bryopsis plumosa* f. *subsimplex* Holmes & Batters, Ann. Bot. (London) 5: 76. 1890, nomen nudum.

*Bryopsis plumosa* [var.] *nuda* Holmes in Batters, J. Bot. 40 (Suppl.): 21. 1902, nomen nudum.

*Bryopsis plumosa* var. *simpliuscula* Zanardini, Atti Ist. Veneto Sci,, Lett. Arti 6: 244. 1847, nomen nudum.

*Bryopsis plumosa* [var.] *subsimplex* Holmes & Batters in Batters, J. Bot. 40 (Suppl.): 21. 1902, nomen nudum.

*Bryopsis pseudoplumosa* V. J. Chapm., J. Linn. Soc. Bot. 55: 484, fig. 148 II; pl. 45. 1956, non *Bryopsis pseudoplumosa* Ardiss. (1864). Type locality: Taylor's Mistake, Banks Peninsula, South Island, New Zealand.

*Bryopsis pulvinata* Oltm. (1904), nomen nudum.—The taxon to which Oltmanns referred was later described as *Bryopsis monoica* Berthold in Funk (1927). = *Bryopsis hypnoides* J. V. Lamour, fide Gallardo et al. (1993).

*Bryopsis pumila* Zanardini, Atti Ist. Veneto Sci,, Lett. Arti 6: 245. 1847. Type locality: Venice, Adriatic Sea. "Taxon inquirendum."

*Bryopsis pusilla* Levring, Acta Univ. Lund., N. F., 34(9): 11, figs. 6A–D; pl. III, fig. 8. 1938. Type locality: Port Elizabeth, Cape Prov., South Africa.—This name was listed by Silva et al. (1996); however, Seagrief (1984) reported that Papenfuss indicated in a personal communication dated 1970 that this entity is merely a juvenile form of *Codium*, and thus the name "should disappear from the literature."

*Bryopsis ramosa* Schousb. in Bornet, Mém. Soc. Sci. Nat. Cherbourg 28: 213. 1892, nomen nudum.

*Bryopsis saburralis* De Not., Prosp. Fl. ligust., p. 73. 1846. Lectotype locality: Genoa, Italy; and "Nizza" = Nice, France. = *Poropsis saburralis* (De Not.) Kütz. (1856). See Nizamuddin et al. (1994).

*Bryopsis seminuda* Menegh., Giorn. Bot. Ital. 1(2): 253. 1845. Type locality: Capo Cesto, Croatia, Adriatic Sea. "Taxon inquirendum," fide Gallardo et al. (1993).

*Bryopsis setacea* J. V. Lamour., in Dumont D'Urville, Enum. pl. Ponti-Eux., p. 130. 1822. Type locality: Constantinople = Istanbul, Turkey. "Taxon inquirendum," fide Silva et al. (1996).

*Bryopsis simplex* Menegh. ex Kütz., Phycol. general., 306. 1843. Syntype localities: Genoa, Italy, and Nice, France; lectotype locality: Genoa, Italy, fide Wynne & Leliaert (2001). = *Pedobesia simplex* (Menegh. ex Kütz.) M. J. Wynne & Leliaert (2001).—Four varieties of *B. simplex* recognized by Meneghini (1845a) were not given formal status within *Pedobesia simplex* by Wynne and Leliaert (2001): *B. simplex* var. *nuda* Menegh.; *B. simplex* var. *plumata* Menegh.; *B. simplex* var. *prolifera* Menegh.; and *B. simplex* var. *fasciculata* (Mont.) Menegh. Wynne and Leliaert (2002) also did not recognize within *P. simplex* the following variety: *B. simplex* var. *versatilis* De Not. in De Notaris and Baglietto (1869).

*Bryopsis tenuissima* Moris & De Not., Mem. Acad. Roy. Sci. Turin, ser. 2, 2 (Cl. Sc. Fis. e mat.): 259, pl. VI, fig. III. 1839. Type locality: Cabrera, Balearic Islands, Spain. = *Derbesia tenuissima* (Moris & De Not.) P. Crouan & H. Crouan (1867).

*Bryopsis thuyoides* Kütz., Tab. phycol. VI: 28, pl. 78, Fig. I. 1856, non *Bryopsis thuyoides* Menegh. (1845). [=*B. cupressina* J. V. Lamour.]. Type locality: Napoli, Italy.—Pignatti (1962) treated *B. thuyoides* Kütz. as conspecific with *B. plumosa*.

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